Supervised Study Plan of Teaching

SHREVE

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FORMERLY INSTRUCTOR IN
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TEACHERS COLLEGE, COLUMBIA UNIVERSITY

SUPERVISED STUDY PLAN OF TEACHING

SUPERVISED STUDY PLAN OF TEACHING

BY

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THIS BOOK IS DEDICATED

TO

MY FATHER AND MOTHER

13419

EDITORS' INTRODUCTION

Every new movement in education, particularly in educational method, creates for the time being widespread attention. Then, after a few years, interest in the subject wanes and another movement dominates educational discussion. From each movement of this kind there remains a contribution to educational procedure, and such results of a period of stimulation need to be summarized and incorporated in the teaching procedures of the classroom.

This is particularly true of supervised and directed study. A few years ago there appeared numerous articles and books dealing with the problem of teaching pupils how to think and with the direction of their study efforts. Many investigations of a scientific nature have been conducted within recent years in order to determine the value and method of study procedure. There appears to be no question whatever about the benefits to be derived from guiding pupils' study habits; in all teacher-training institutions of today units of work dealing with directed study are incorporated in the courses.

Supervised Study Plan of Teaching is a distinct contribution to educational literature in that

it summarizes all previous investigation and experience in this field. It brings to the teacher's aid a summary of scientific data upon which to base procedures in directing study and it also furnishes concrete applications to classroom problems. The author has kept in mind the problems of children which arise in study, particularly those that refer to the psychology of learning. He interprets teaching largely as the task of arranging proper learning situations for children and shows how skilful guidance may be provided for the learner. However, he avoids over-direction in study. One of the chief dangers of supervised and directed study has been that children receive too much help in the solution of their problems. The author endeavors to show how this error may be avoided.

This book has been prepared for use in colleges and normal schools and for reading circles. An effort has been made to reduce the scientific data to simple language, and technical terms are sparingly employed. At the same time the author has maintained the precision of statement proper in dealing with scientific facts. The schoolroom situation has been constantly kept in mind throughout the preparation of the manuscript.

T. A.
R. R.

PREFACE

This book has been written primarily as a text-book for normal schools and colleges. It may also well be used as a reading circle book for teachers in service.

Every successful movement in education must be a progressive movement. When a movement becomes formalized it loses its vitality and fails to make any further contribution to educational progress. Supervised study is now in grave danger from the deadening influence of formalism. This promising movement will fall far short of its possibilities if the popular notion is not revised and reconstructed in the light of the knowledge that is rapidly accumulating in the field of educational psychology. To aid teachers in the process of reconstructing and refining their concepts of supervised study, the earlier chapters of this book have been written. They bear the following titles:

What Has Supervised Study Accomplished?
The Meaning of Supervised Study
Administration of Supervised Study

The main function of these chapters is to prepare the way for the presentation and reception of the chapters that follow.

The constructive part of the book is based upon two fundamental ideas: (1) The pupil learns through his own reactions, not by being "sprayed with ideas"; and (2) The function of the teacher is to stimulate and guide the pupil's learning activities. Consequently, the main content is organized around two vital questions: First, How does the pupil learn? and second. How can the teacher stimulate and guide the learning activities of the pupil? Each of the chief types of classroom activities is treated from two viewpoints: (1) What factors are involved in this type of activity? and (2) How can the teacher provide for these factors in the schoolroom? In carrying out this idea an attempt has been made to analyze each of the more important types of classroom activities into its chief factors and to show how the teacher can provide for them in supervising the study of a class or group of pupils. One of the virtues of this twofold treatment is that it furnishes a liberal amount of review work that is stimulating and free from monotony.

Some experimental data have been included to demonstrate how study may be supervised and also as a partial justification of the theories set forth in the text. In this connection the use of a few highly technical terms is unavoidable but these need not unduly disturb the reader who is untrained in statistical methods. Usually, the general mean-

ing can be grasped readily without a knowledge of statistical terms such as *probable error* or *probable error of the difference.* The trained reader will, of course, appreciate the full significance of these terms.

I am indebted to so many teachers and writers that it would not be practicable to enumerate all of them. I have drawn material freely from many sources, quoting opinions when more reliable data were not available. In every case, however, the source of the material is indicated in the footnote references. Special acknowledgment is due my colleague, Professor Walter Barnes of the English Department, who read the manuscript and offered many valuable suggestions. I am also greatly indebted to my wife, Ruth Cobb Shreve, for aid in preparing the manuscript. Special mention should be made of the following superintendents, principals, and teachers, whose hearty coöperation made possible the experimental work reported in chapter XIII: Superintendent O. G. Wilson, Principal G. H. Colebank, H. Y. Clark, Elizabeth Koletka, Principal H. M. Cole, Lulu M. Jones, Evelyn Prickett, and Willard Clayton, Fairmont, West Virginia; Superintendent Edgar B. Simms, Principal Howard M. Jones, Orpha Ashburn, Lyda B. Strickling, and Bessie I. Nutter, West Union, West Virginia; Superintendent Goff D. Ramsay, Ira Taylor, Mary P. Woodell, Pennsboro, West

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F. S.

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PART ONE

GENERAL FACTORS OF SUPERVISED STUDY

CHAPTER I

WHAT HAS SUPERVISED STUDY ACCOMPLISHED?

Questions to Be Kept in Mind When Reading

1. Is supervised study superior to the usual recitation?
2. What have the theoretical discussions contributed to the supervised-study movement?
3. Are the conclusions that have been drawn from the statistical and experimental studies valid?
4. Is the supervised-study movement sound in theory?
5. Why has supervised study failed to show more favorable results on the basis of quantitative data?

The teaching function in its historical development has passed through two well-defined stages and is now entering upon a third stage. In the first, the teacher was essentially a drill master and disciplinarian. His business was to keep order, assign lessons, and hear recitations. He employed individual and memoriter methods, making no attempt to direct the pupil's study. The second stage was marked by an attempt to psychologize the process of instruction. In the United States this movement comprised approximately the years from 1860 to

1910. In this stage the function of the teacher was to instruct the pupils, that is, to introduce the subject matter to the mind of the child in the most approved psychological fashion. The attempt to psychologize the process of instruction developed elaborate methods of teaching that culminated in the five formal steps of the recitation. Very little attention was given, however, to the supervision of the pupil's study, the chief emphasis being placed upon the process of instruction.

The third, or present, stage is marked by an attempt to adjust the work of the school to the needs and capacities of the pupil and by a growing recognition on the part of teachers that the pupil learns through his own responses to stimuli, not by passively listening to instruction. The idea is beginning to prevail that the chief function of the teacher is to stimulate and guide the pupil's learning activities. This view of the teaching function, together with recent changes in social and economic conditions, has given rise to the movement known as *supervised study*. This movement has taken several forms, such as the assembly hall study period, conferences with pupils, the use of a coach, and programs with printed directions for study; but, whatever the form, the underlying idea has been to provide more effective direction to the pupil's study. There is a growing tendency to view the learning processes from the standpoint of the pupil rather than from

that of the teacher, to supervise study rather than to instruct the pupil.

But what has supervised study accomplished? *Is the supervised-study plan of teaching superior to the usual recitation plan?* As a means of finding an answer to these questions, let us review the literature in this field. Since 1910 there have appeared numerous magazine articles on supervised study, which, for convenience of treatment, may be divided roughly into three groups: (1) theoretical discussions, (2) statistical studies, and (3) experimental investigations. Each of these groups will be considered in turn.

I. Theoretical Discussions

Although articles of this type have only beliefs and opinions to offer, they have made a valuable contribution to the supervised-study movement. In the first place, our concept of supervised study has been derived largely from these theoretical discussions. Again, they have stimulated interest in the movement and provoked thought as to the soundness of the theory underlying the practice of supervised study. All are agreed that supervised study has accomplished important results. Breslich[1] claims that the attempt to direct the pupil's study is good for the teacher and for the pupil as well.

[1]Breslich, E. R. "Supervised Study in Mathematics." *School Review.* XXXI: 733-747. 1923.

Mason[1] says that supervised study saves the slow pupil from despondency and educational suicide and makes better provision for the fast worker. Mitchell[2] maintains that it abolishes the lazy teacher and improves the study habits of high school pupils. Other writers[3] voice similar opinions. In so far, then, as the opinions of these writers are valid supervised study is sound in theory and, wherever it has been given a fair trial, has produced good results.

In a recent survey of the literature of supervised study, Brownell[4] finds thirty-four specific merits advanced by the proponents of supervised study. Among these are better assignments, recognition of individual differences, better motivation, better quality of work, fewer failures, and better study habits.

In criticisms of these claims Brownell offers five possible objections:

1. These claims assume that supervised study works by magic.
2. They are made as if supervised study existed in but a single form.

[1]Mason, W. L. "A New System of Supervised Study." *Education*. XXXVIII: 117-120. 1917.

[2]Mitchell, H. "Supervised Study in Modern Languages." *Education*. XXXVIII: 385-387. 1918.

[3]For other references, see the bibliographies at the end of this chapter and chapter II.

[4]Brownell, W. A. *A Study of Supervised Study*. pp. 20-25. Bulletin No. 25. Bureau of Educational Research, University of Illinois. Urbana. 1925.

3. In some cases the claims are inconsistent with each other; e. g., that supervised study permits more ground to be covered and that lessons may be shorter and more intensive.

4. Some of the claims are doubtful on the face of them; e. g., supervised study enables the teacher to handle more pupils.

5. Many of these arguments might be advanced with equal validity for the traditional type of procedure.

Doubtless, the claims made on the basis of opinion have some value but they cannot be accepted at face value. They must be evaluated in the light of the statistical and experimental data.

II. Statistical Studies

The articles of this type attempt to evaluate supervised study through the application of indirect measure, such as the opinions of pupils and teachers, the percentage of promotions and failures, and the general improvement of scholarship. The more important articles of this group are considered in the following pages.

Reavis[1] tried out a study program for high school pupils. He placed in the hands of each pupil a card containing on one side a form for the pupil's study program and on the reverse, directions for study. On the front of the card the pupil was required to place his study program for the term. Then he

[1] Reavis, W. C. "Importance of a Study Program for High School Pupils." *School Review*. XIX: 398-405. 1911.

was urged to follow his program and to utilize constantly the following directions on the back of the card:

1. Follow your program regularly.
2. If possible study your lesson immediately after the assignment is made.
3. Take brief notes and afterwards study by outline.
4. Use dictionaries and reference books for points not clearly comprehended.
5. Concentrate your mind so that outside interests will not frequently disturb your study.
6. Do not try to commit exact words until you understand their content.
7. Connect the important facts of the new lesson with facts previously learned.
8. Make comparisons and contrasts when possible.
9. Carefully review and think over the previous lesson before beginning the next.
10. The extra effort spent on preparation pays the greatest dividends.

The study of the pupils was directed in this way for a period of two and a half years; then an investigation was made to determine the value of this type of supervised study. The more important findings are summarized in Tables I and II.

From these and similar data having reference to hours of home study Reavis drew the following conclusions:

During the two and a half years that study has been closely supervised and regular programs for each pupil

TABLE I. SHOWING THE DISTRIBUTION OF GRADES IN DEPORTMENT BEFORE AND AFTER THE INTRODUCTION OF A STUDY PROGRAM (AFTER REAVIS)

GRADES	FRESHMEN		SOPHOMORES AND JUNIORS	
	Without Program	With Program	Without Program	With Program
A plus	2	30	0	27
A	13	7	16	13
B plus	16	2	15	4
B	6	2	5	0
C plus	2	0	4	0
C	6	0	4	0
X (failure)	0	0	0	0

TABLE II. SHOWING THE DISTRIBUTION OF GRADES IN LATIN WITH AND WITHOUT A STUDY PROGRAM (AFTER REAVIS)

GRADES	LATIN I Without Program	LATIN I With Program	CAESAR Without Program	CAESAR With Program	VIRGIL With Program
A plus	1	9	2	17	18
A	7	7	15	7	10
B plus	7	5	7	7	4
B	1	6	4	2	0
C plus	2	4	3	0	1
C	5	6	1	0	0
X (failure)	9	4	1	0	0

strictly followed, three things have been accomplished with more or less success: (1) The problem of discipline has been practically solved; (2) considerable improvement has been made in scholarship; (3) regular hours of home study have been provided for by the large majority of the students.

Giles[1] made an investigation of the study habits of high school pupils. He employed the questionnaire method and obtained answers to a series of twelve questions from 258 pupils in the DeKalb Township High School in Illinois. His most significant results are summarized in Table III.

Giles further found that the time spent in the preparation of a lesson varied widely with the different subjects, the general average for all subjects

TABLE III. SHOWING DATA FROM GILES'S INVESTIGATION

THE CONTENT OF THE QUESTIONS	No. of Pupils	Per-centage
Having a definite time for home study	195	79
Having separate rooms for study	129	50
Writing notes on lessons studied	113	44
Outlining lessons studied	118	46
Underscoring the most important points	192	75
Repeating lessons to themselves	177	69
Reviewing earlier lessons	154	60
Attempting to find the most important points	208	81

[1] Giles, F. M. "Investigation of the Study Habits of High School Students." *School Review*. XXII: 478-484. 1914.

of the curriculum being less than forty minutes. Closing the book and repeating the material read, underscoring, outlining, and writing notes were most frequently named as being helpful devices in study.

Rickard[1] made a similar investigation of the study habits of the high school pupils of Oakland City, Indiana, including grades 7 and 8. To avoid the influence of leading questions he gave the pupils the following assignment:

> With your assignment for the next period before you:
>
> 1. Describe point by point the different things you will do in preparing it.
> 2. State the general topic with which your assignment deals.
> 3. Give your grade.
> 4. State any special device which you use.
>
> Prepare your lesson and see if you did less or more than you indicated and correct accordingly.

Rickard found that most pupils read the lesson over once and that only a small percentage of them used any one of the other devices that pupils ought to employ in their study. For example, only about 20% asked themselves questions, only about 3% used outlines, only about 25% exercised judgment in the choice of topics, and only about 5% underscored important words.

[1] Rickard, G. E. "High School Students' Descriptions of Their Methods of Study." *School Review*. XXII: 673-677. 1914.

Noting that the percentage of the pupils employing certain devices was relatively high in the classes that had been drilled recently in the use of these devices, Rickard concluded:

1. That teachers can modify the study habits of pupils by conscious attention to methods and devices.
2. That habits of study acquired temporarily will not persist unless made the object of persistent and conscious effort on the part of the teacher.

The investigations made by Giles and Rickard contain very little data bearing on the value of supervised study but they are valuable because they show the need for supervision of the study of high school pupils.

Brown[1] reported favorable results for supervised study in the high schools of Joliet, Illinois. He required every teacher to make a report at the close of each semester showing the number enrolled in each class, the number in the class at the close of the semester, the number passing, and the number failing, with the causes of failure. These reports showed a decrease in the percentage of failures for a four-year period as shown in Table IV.

Brown observed that the percentage of failures was gradually being reduced to a minimum. The last semester of 1914 showed thirty-eight classes in

[1] Brown, J. S. "Supervised Study in the High School." *School and Home Education.* February, 1915. Public School Publishing Company, Bloomington, Ill.

which there were no failures. Hall-Quest, on the basis of the data presented in Table IV, stated that there was a consistent decrease in the percentage of failures from 1911 to 1914 and attributed this decrease to the influence of supervised study.

TABLE IV. SHOWING THE PERCENTAGE OF FAILURES (AFTER BROWN)

SUBJECT	1911	1912	1913	1914
Algebra	24	22	15	12
Arithmetic	26	20	12	13
Geometry	29	19	17	16
German	21	20	13	14
Latin	22	19	16	13
French	10	9	8	9
Physiography	12	10	8	9
AVERAGE	20.8	17.0	12.7	12.3

Loveland[1] introduced the following plan for the supervision of study in the high school of Pottstown, Pennsylvania. At the end of the school day a study period was arranged in which the teachers tested the efficiency of the assignment before the pupils went home and gave them directions for study according to their needs. The pupils making an average of 90% in their work were dismissed at

[1] Loveland, L. I. "Supervised Study." *School Review*. XXIII: 489, 490. 1913.

the beginning of this study period. Records showing the nonpromotions and eliminations were kept for a period of six years from 1909 to 1915. The results are summarized in Table V.

TABLE V. SHOWING NONPROMOTIONS AND ELIMINATIONS (AFTER LOVELAND)

Year	Passed	Nonpromotions		Eliminations	
1909–10	303	26	7%	74	18
1910–11	202	17	6	68	17
1911–12	277	19	6	54	15
1912–13	219	27	11	54	13
1913–14	288	26	8	60	16
1914–15	324	19	6	43	12

Loveland concluded that the foregoing plan is superior to the divided-period plan for the following reasons:

> It does not keep the studious pupil in school longer than he should be confined, it puts emphasis on the real work in hand and the teacher has only the weak pupil to deal with, and it gives a sensible incentive to any pupil to improve his work so as to gain recognition.

Loveland implied, though he did not state, that his data showed a consistent decrease in nonpromotions and eliminations, due to supervised study.

Erickson[1] gave the divided-period plan of super-

[1] Erickson, J. E. "Results of Supervised Study in the Houghton, Michigan, High School." *School Review*. XXIV: 752-758. 1916.

vised study a trial for one semester in the high school of Houghton, Michigan. At the end of the semester he attempted to evaluate the results on the basis of data collected by the questionnaire method. All the pupils were asked to write out answers to the following questions:

1. Do you consider the supervised-study plan better than the old assembly-room plan?
2. Do you do your best work when studying at home or in school?
3. Are you doing better, about the same, or poorer, work than last year?
4. Do you do less, about the same, or more, home study?
5. In what department do you think supervised study is most beneficial?

The manuscripts were analyzed and the results summarized as shown in Table VI. In tabulating

TABLE VI SHOWING THE RESPONSES TO THE QUESTIONNAIRE (AFTER ERICKSON)

Percentage considering supervised study better	77.7
Percentage doing best studying at school	56.5
Percentage doing better work this year	39.0
About the same grade of work	42.0
A poorer grade of work	19.0
Percentage doing less home study	49.0
About the same amount of home study	30.0
More home study	21.0

the responses to question 5, it was found that the pupils ranked the departments in the following order, placing first the subject in which supervised study was believed to be most beneficial: mathematics, science, language, history, and English.

Erickson[1] made no large claims on the basis of his data. He remarked:

> I do not contend that the results of these questionnaires have a definite scientific value, but they are of considerable interest to me and may have some value in regard to the success or failure of supervised study.

Proctor[2] made an investigation of the status of supervised study on the Pacific coast. He secured from high school inspectors and state superintendents the names of the high school principals in their territory who had inaugurated any form of supervised study. Then he sent a questionnaire to all the principals whose names were thus secured. (Number not stated.) Returns were received from forty-two schools in four states. The replies were tabulated with the results shown in Tables VII and VIII.

In response to the question relating to the effect of the lengthened-period plan of supervised study on the study habits of the pupils, the thirty-one prin-

[1] Erickson, J. E. "Results of Supervised Study in the Houghton, Michigan, High School." *School Review*. XXIV: 752-758. 1916.

[2] Proctor, W. M. "Supervised Study on the Pacific Coast." *School and Society*. VI: 326-328. 1917. The Science Press, New York.

cipals employing this type expressed the opinions shown in Table VIII.

TABLE VII. SHOWING THE TYPE OF SUPERVISED STUDY EMPLOYED ON THE PACIFIC COAST (AFTER PROCTOR)

Lengthened period	31
Full-time study coach	6
Conference periods	2
Special study hall	3
TOTAL	42

TABLE VIII. SHOWING THE OPINIONS OF PRINCIPALS OF THE LENGTHENED-PERIOD PLAN (AFTER PROCTOR)

Improved study habits	26
Had no apparent effect	1
Helped the slow pupils only	2
Had no opinion	2
Greatly reduced home study	22
Increased home study	1
No change in home study	4

Furthermore, one principal reported a decrease in failures from 28% to 17%; another, that the average marks were increased 10%; and a third, that there was an increase in grades from 78% to 82.5% after a year or two of supervised study.

What, now, do these statistical studies indicate as to the value of supervised study? Do they prove

that supervised study is superior to the usual recitation plan?

Giles, Erickson, and Proctor employed the questionnaire method in collecting their data. In evaluating their studies, therefore, one must consider the reliability of this method. Following Thorndike and Rugg, one may classify the questions used by these investigators into three groups on the basis of their reliability:

1. Factual questions; e. g., "Do you have a separate room for study?"
2. Memory questions; e. g., "How long do you study at a time?"
3. Questions requiring a judgment or opinion; e. g., "Are you doing better, about the same, or poorer, work than last year?"

The foregoing questions are given in order, the most reliable being placed first.

In discussing the trustworthiness of the questionnaire as a source of data, Thorndike[1] declares:

> No research can ever attain a reliability beyond that possessed by the data with which it starts. And the first duty of any study of individual responses to questions and suggestions is to measure their reliability as measures of the trait in question. Adults as well trained as college seniors in even the simplest matters of present objective fact such as are involved in the questions, "How tall are you?" and "What is the circumference

[1] Thorndike, E. L. *Educational Psychology.* Vol. I. Chap. 4. Teachers College, Columbia University, New York. 1913.

of your sister's head?" make gross errors. The errors increase in number and degree when the report requires memory; increase further when the fact is a report of subjective condition; and multiply like bacilli when the fact requires consideration of the general drift of experience. Again, no matter how clearly the question is put, some individuals misunderstand it. Finally, any question acts as a suggestion and with uncritical minds will surely produce affirmative answers.

Rugg[1] insists that questions used in an investigation must be specific, unambiguous, and as factual as possible, and that they should involve a minimum of judgment, discrimination, or deferred memory.

The type of question employed in an investigation, then, may be used as one measure of reliability. Table IX shows how the questions asked by the preceding investigators are distributed among the various types. Proctor did not state in his report the questions that he used in collecting his data but it is apparent that there were six questions, three of which were factual and three of which involved judgment.

It will be observed that ten of the twenty-four questions constituting these questionnaires belong to the group having the smallest measure of reliability and that six more are in the group having only the median amount of reliability. Consequently,

[1]Rugg, H. O. *Statistical Methods Applied to Education.* Chap. II. Houghton Mifflin Company. 1917.

TABLE IX. SHOWING THE TYPES OF QUESTIONS USED IN THE FOREGOING STUDIES

INVESTIGATORS	QUESTIONS		
	Factual	Memory	Judgment
Giles	5	5	2
Erickson	0	1	5
Proctor	3	0	3
TOTAL	8	6	10

it is probable that more than half of the data collected through these questionnaires has but a small measure of reliability. Moreover, the more significant conclusions of these studies are based upon data collected in answer to questions having the smallest measure of reliability, as, for example, "Do you consider the supervised-study plan better than the old assembly-room plan?"

In view of the foregoing facts it seems fair to conclude that the data collected through the use of these questionnaires have only a small measure of reliability and that no valid conclusions can be drawn from these data, for no conclusions can attain a reliability beyond that of the sources upon which they are based.

Brown, Reavis, and Loveland attempt to evaluate supervised study by employing indirect tests, such

as improvement in scholarship and decrease in percentage of failures and nonpromotions but their conclusions are of doubtful validity. While Reavis' data show a considerably higher percentage of high grades and a correspondingly lower percentage of low grades and failures for the group following a supervised-study program, there is nothing to indicate that the groups compared were equal in ability to learn or in initial achievement. The apparent superiority of the supervised-study group may have been due to superior ability or to some other factor, rather than to a difference in the method of studying. In other words, the influence of supervised study was not isolated and measured and all the other essential factors kept constant.

Brown found a fairly consistent decrease in the percentage of failures over a period of four years but Loveland's percentage of nonpromotions does not show any significant decrease over a period of six years. (See Tables IV and V.) Moreover, no comparison is made with schools not employing a supervised-study plan. Furthermore, a decrease in the percentage of failures may well be attributed to other factors, such as a change in the standard of grading, a general improvement in the quality of teaching, or the introduction of a more flexible program of studies. There is nothing in the data of these reports to show conclusively that

the improvement in scholarship or the decrease in failures and eliminations is due to the introduction of supervised study.

These statistical studies, then, are open to three serious criticisms:

1. They employed indirect and unreliable measures of progress.
2. They failed to provide the necessary controls.
3. They employed an unreliable method of collecting data.

Consequently, the conclusions reached by this group of investigators are lacking in validity. Supervised study may be superior but these statistical studies do not establish its superiority.

III. Experimental Investigations

The studies of this group, having been conducted on a more scientific basis, merit a more careful consideration. The important studies are reviewed critically in the following pages.

Breslich[1] conducted the first noteworthy experimental investigation in the field of supervised study. For this experiment he used as subjects two sections, known as A and B, of a class in algebra in the University High School of the University of Chicago. The two sections were approximately equal in achievement in this subject, as was indicated by

[1] Breslich, E. R. "Teaching High School Pupils How to Study." *School Review*. XX: 505-515. 1912.

the grades for the previous semester. These grades were distributed as follows:

	A	B	C	D	F	Average
Section A	25	25	37.5	12.5	0.0	81.4
Section B	29.4	23.5	23.5	17.7	5.9	79.4

Section B was directed according to the divided-period plan of supervised study for fourteen lessons, while Section A was taught by the usual recitation and home-study plan. Section B did all the work in the class period of forty-five minutes, whereas Section A devoted approximately two hours to each lesson, an hour and fifteen minutes to home study, and forty-five minutes to recitation. Upon the completion of the fourteenth lesson, the same test was given both sections with the following result:

Breslich continued the experiment for six more lessons. In this part of the experiment Section A worked under the supervised-study plan and Section B under the home-study plan. On the final

	A	B	C	D	F	Average
Section A	7.1	21.4	21.4	0	50.0	62.8
Section B	0.0	6.2	37.5	25	31.9	65.5

test, which was the same for both sections, the comparative gains over the records on the previous test were:

Section A, supervised group.....14.7%
Section B, home-study group.....20.9%

In evaluating his results Breslich observed:

1. Supervised study increased the percentage of lower grades and decreased the percentage of higher grades.
2. There was a slight difference in the first part of the experiment in favor of the supervised-study group.
3. The supervised-study group made more progress in learning to work independently.

Breslich's conclusions, however, were drawn from meager data. The whole experiment comprised only twenty lessons in algebra, with two sections of one class acting as subjects. The number of pupils participating in the experiment was not stated but evidently it was small, since only two sections of one class were employed as subjects. Furthermore, to be regarded as significant, it is required statistically that the difference between two means be at least twice the probable error of that difference. This test was not applied to the data to determine the reliability of the difference in the means. Since the difference was only 2.7% for the first fourteen lessons it may well be doubted whether there was any significant difference in the two groups. Then, too, in the second part of the

experiment, comprising six of the twenty lessons, the unsupervised group (formerly the supervised group) made a greater gain over its previous record than did the supervised group. Breslich attributed this apparent superiority of the unsupervised group to the effect of supervision in the first part of the experiment carrying over to the second part. The fact, however, that Section B, whether supervised or unsupervised, made the greater gain in both periods of the experiment leads one to suspect that its superiority was due to some factor other than supervised study, perhaps to greater initial ability. The acceptance of the latter explanation, which seems equally as plausible as the former, would cast discredit on the whole experiment, for this difference in initial ability would be sufficient to account for the small difference between the two groups. Furthermore, teachers' marks have been found to be very unreliable. It should be noted that the conclusions of this experiment are based upon teachers' marks. The unavoidable errors in grading would be sufficient, perhaps, to account for the small difference between the two groups.

Minnich[1] conducted an experiment designed to test the value of supervised study in plane geometry. He employed as subjects thirty-six pupils in the

[1]Minnich, J. H. "An Experiment in the Supervised Study of Mathematics." *School Review*. XXI: 670-675. 1913.

high school of Bloomington, Indiana. These pupils were divided into two groups, equal in size and approximately equal in initial ability, on the basis of the grades made in algebra for the three previous semesters. One group worked under a supervised-study plan and the other under the ordinary recitation method. The unsupervised group prepared their lessons at home and recited during the first class period; the supervised group recited in the second class period, then remained for the third period to prepare the work for the next day. If any student completed the assignment before the end of the study period additional work was provided him. An effort was made in this study period to teach the pupils how to study. They were free to call for help but that help was given largely in the form of questions and suggestions. Records were kept of the grades on the daily recitations and of the number of recitations made weekly by each group, and curves based upon these records were plotted. Tests were given at the end of the first and second six weeks that covered the work done in these periods; at the end of the semester there was a final test on the work of the whole semester. Occasionally, during the progress of the experiment, tests were given on new material. In every instance the same test was used for both groups. With the exception of the last test the quantity of work did

not affect the grade, for the papers were graded only on the quality of the work done. All the papers were graded by the instructor but they were so arranged that he did not know whose paper he was grading.

Minnich found that on the basis of weekly averages the supervised class had higher averages than the unsupervised for ten weeks, the same averages for three weeks, and lower averages for two weeks. In fifteen weeks the supervised class made 466 recitations, while the unsupervised class made only 352. On the tests the two groups made the following records:

	Supervised	Unsupervised	Difference
First 6 weeks	77.3%	68.7%	8.6%
Second 6 weeks	81.2	80.4	.8
Final test	92.4	80.1	12.3

On the tests on new material the supervised class averaged 13.1% more than the unsupervised class. All the pupils in the supervised group passed, while two of the unsupervised group failed.

The experiment was extended over a period of fifteen weeks, which is probably a sufficient length of time to produce actual results. The two classes were comparable in size and perhaps also in initial

ability, although semester grades are a somewhat unreliable measure of ability. The comparisons were based on the weekly average of grades made in the daily recitations, on the number of recitations per week, and on the average score on the special tests devised by the teacher. But the variability of teachers' marks operating in this case tends to reduce the reliability of these ratings as measures of progress. The investigations of Kelly,[1] Starch and Elliott,[2] and Johnson[3] furnish convincing evidence of the unreliability of marks assigned by teachers.

Moreover, comparative scores are often influenced largely by the teacher's attitude. For example, a teacher who believes in supervised study will do better teaching with the supervised group and may unconsciously favor this group in scoring the papers. In view of the foregoing facts Minnich's results cannot be accepted at their face value. Then, too, his statistical treatment of his data is inadequate, for he failed to apply any measure of reliability. Furthermore, his report does not provide sufficient data to enable one to apply the measures of re-

[1] Kelly, F. J. "Teachers Marks." Colorado University Contributions to Education. No. 66.

[2] Starch, Daniel, and Elliott, E. C. "The Reliability of Grading Work in History." *School Review*. XXI: 676-681. 1913.
— "The Reliability of Grading Work in English." *School Review*. XX: 442-457. 1912.

[3] Johnson, F. W. "A Study of High School Grades." *School Review*. XIX: 13-24. 1911.

liability and thus determine the validity of his results.

Grace A. Dunn[1] conducted an experiment in supervised study in language, using as subjects the pupils of the fourth grade in a town system near New York City. The pupils, numbering twenty-two, were divided into two sections, known as A and B, of equal size and approximately equal ability, as determined by the scores on the Trabue and Thorndike Tests in Language. Both sections were given twenty lessons of thirty minutes each. They had the same assignment and the same amount of time for study but the study of Section A was closely supervised, while Section B was left to its own resources in preparing each lesson. At the close of each week the pupils were tested and rated on their work for the week, the tests being the same for both sections. The general average of these ratings for the four weeks gave the following results:

Section A, supervised group.....85%
Section B, unsupervised group.....43%

On the basis of these averages Miss Dunn concluded that there was a decided difference in favor of supervised study but she failed to use any measure of reliability and her method of grading

[1]Dunn, Grace A. "The Value of Supervised Study." *Teachers College Record.* XVIII: 430-437. 1917.

was not made clear. It appears, however, from the report that her ratings were based upon tests and exercises making a heavy demand upon judgment. For example, with reference to the work of the first week, she states, "In rating the work, the teacher considered the organization, originality, clarity of expression, and general appearance of the reproduction work, and the intelligent appreciation and interest which should have been the outcome of the study of the poem." Now it is obvious that the foregoing factors could not be rated with a reasonable degree of accuracy. Consequently, allowance must be made for large errors in grading.

Moreover, there is nothing to indicate that the teacher made an earnest effort to maintain an unbiased attitude in conducting the experiment. On the contrary, from reading the report one gets the impression that she slighted the work of the unsupervised section and put forth every effort to achieve unusual results with the supervised section. The very low general average of the unsupervised section confirms this impression. Other investigators have found no such marked difference in two comparable sections. Again, all measures of reliability were omitted, only average scores being included in the report. One may well doubt, therefore, the validity of the results.

Breed[1] attempted to evaluate the divided or double-period plan of supervised study. . He used as subjects thirty-four classes in Latin, algebra, and English composition, from fourteen high schools. Satisfactory records were obtained from 596 pupils. Definite and detailed directions in mimeographed form were placed in the hands of the principals and teachers coöperating in the experiment. Two plans were outlined, either of which a school had the right to follow.

Plan I provided for one teacher to teach two sections of about the same size and approximately equal ability as determined by preliminary tests devised by the teacher or the mid-year marks in the subject chosen for the experiment. These sections were known as Section A and Section B. Section A was taught according to a supervised-study plan for six weeks and Section B according to the usual recitation plan. Each section had the same length of period and covered the same subject matter, both in kind and amount. Thus the work continued for six weeks, when both sections were given the same semifinal test devised by the teacher. The procedure was then reversed by teaching Section B according to the supervised-study plan and Section A according to the usual recitation method.

[1]Breed, F. S. "The Measured Results of Supervised Study." *School Review*. XXVII: 186-204; 262-284. 1919.

A second time both sections covered the same subject matter and took the same final test devised by the teacher. All the test papers were scored by the teacher; then they were sent to the Educational Laboratory of the University of Michigan and scored by a competent grader who was selected by the director of the experiment on the basis of special fitness and paid for the service. The same grader in every case scored all the papers of the groups compared. The averages of the teacher's grades and the laboratory grades were taken as the true score for each pupil.

Plan II required two teachers, known as X and Y, and two sections, known as A and B. For six weeks teacher X taught Section A according to the supervised-study plan while teacher Y taught Section B according to the usual recitation plan. After the semifinal test, which was devised by the teachers in coöperation and was the same for both sections, the teachers exchanged sections for the final period of the experiment. At the close of the second period both sections were given the same final test, devised by the two teachers in coöperation. The scoring was done in the same manner as in Plan I.

All but one school chose Plan I, probably because this plan could be adjusted more readily to existing school conditions.

A list of suggestions designed to embody the theory and practice of the divided-period plan of supervised study was placed in the hands of each coöperating teacher. These suggestions emphasized particularly the following factors:

Individualizing instruction
Directing the pupils' efforts
Helping them judiciously
Teaching them how to study
Increasing the importance of the assignment
Giving special attention to the lowest third of the class
Providing extra work for the highest third
Decreasing the amount of home study

In general the teachers were directed to proceed in the following manner:

The getting ready process must be prompt and precise with a minimum of noise. No questions are permitted audibly but by raising the hand the pupil indicates a desire to consult the teacher, who passes quietly to the pupil's desk. The pupil and teacher in whispers confer on the difficulty. When not so occupied the teacher moves quietly up and down the aisles, stopping at each desk to inspect the pupil's work. When she finds a pupil employing a wrong method she stops and in a low tone asks why he uses this method. She always requires the pupil to give a reason for what he does. The pupil is expected to make his own corrections with a minimum of suggestion from the teacher. When absolutely necessary to do so she will give the required information.

In addition to the list of suggestions each teacher was provided a mimeographed copy of Whipple's rules for study, to be used in teaching the pupils how to study.

Comparisons were made on the basis of both continuous and more strictly comparable groups. The continuous groups were composed of all the pupils present for all the tests. The strictly comparable groups were selected from the continuous groups in such a manner that the groups to be compared were of the same size, matched individually in ability, and equal, therefore, in average ability. Moreover, the comparable groups were taught by the same teachers and belonged to classes of approximately equal enrollment. Averages were computed on the basis of (1) the teachers' scores; (2) the laboratory scores; and (3) the combined scores but the final judgments were based upon the combined scores. The progress of the various classes was measured by the increase in the average scores. The results are summarized in Table X.

In Table X the percentages are all in terms of supervised study and each one represents the average loss or gain in a particular subject and for one period of the experiment. If the percentage is *plus* it means that supervised study proved to be superior; if it is *minus* it means that supervised study proved to be inferior to the usual recitation method.

TABLE X. SHOWING THE AVERAGE PERCENTAGE OF GAINS AND LOSSES OF THE CONTINUOUS AND COMPARABLE GROUPS (AFTER BREED)

Subject	Number of Pairs of Classes	Percentage of Gain or Loss	
		Semifinal	Final
	Continuous Groups		
Algebra	7	–0.2	–5.3
Latin	2	9.0	7.1
Eng. Comp.	2	–4.4	–3.9
	Comparable Groups		
Algebra	7	1.0	2.7
Latin	2	3.7	5.4
Eng. Comp.	2	–3.8	–6.1

In the three subjects the poorer pupils gained on an average of 3.4% and the better pupils lost 5.7%.

Breed was unwilling to hazard anything more than a factual interpretation of his data but he expressed his opinion as follows:

Supervised study of the kind tested facilitated the

progress of the poorer pupils and, to a correspondingly greater degree, retarded the progress of the better pupils.

Until the divided- and double-period plans meet the objections urged against them, a selective or differential plan of study supervision should be favored by secondary schools, that is, a plan which concentrates on the pupils of less ability.

The technique of supervising the poorer pupils needs to be improved; a technique of supervising the study of the brighter pupils needs to be developed.

The foregoing experiment is by far the most extensive and valuable of all that have appeared in this field. The method of conducting the experiment is about as scientific as it could well be made under actual schoolroom conditions. There is an attempt to control the variable factor of the teacher by providing for an exchange of teachers at the middle of the period or for one teacher to teach both sections. The essential conclusions, however, are based largely on central tendencies which, taken alone, are inadequate measures of group progress. All measures of reliability are omitted and not enough data are provided to enable one to apply these measures and thus determine the validity of the results. The advisability of exchanging groups at the middle of the period may well be questioned, as this allows any group only six weeks to work under supervised study. It may be that six weeks is too short a time to produce any marked differences in

attainments in such subjects as algebra, Latin, and English composition. Further, the experiment deals with only one type of supervised study and the instructions to the teachers indicate that the supervision tested consists largely of better assignments and more individual help, particularly for the poorer pupils. Then, too, there is no statement that the teachers coöperating in the experiment had any special training in the theory and technique of supervised study previous to their participation in this experiment. On the other hand they doubtless had considerable training for the ordinary recitation plan. It is apparent that lack of such training on the part of the teachers—if present—would place the supervised-study group at a marked disadvantage. The experiment, therefore, should not be accepted as final, even with respect to the type of supervision tested; rather it indicates, as Breed points out, that the technique of supervised study needs to be developed and improved.

Brown and Worthington[1] made an investigation to determine the comparative merits of supervised study and the common types of recitation in the Wisconsin high schools. Only four high schools coöperated in the investigation. In each of these schools two classes, approximately equal in learning ability as determined by intelligence tests and other

[1]Brown, W. W., and Worthington, J. E. "Supervised Study in Wisconsin High Schools." *School Review*. XXXII: 603-612. 1924.

objective measures, were organized in some subject. One class followed a supervised-study plan with 60-minute periods, while the other class, with 45-minute periods, followed the usual recitation plan. In each case the classes were about equal in size and were taught by the same teacher. The progress of the groups was measured by comparative tests and by the teacher's marks.

A bibliography on supervised study and a letter explaining the nature and purpose of the experiment were placed in the hands of each teacher coöperating in the investigation.

The results show no marked advantage for supervised study. In almost every comparison the difference in the median scores of the two groups is small. The authors of the report draw the following conclusions:

1. In all, seven pairs of parallel classes were considered in the investigation: two pairs, the algebra classes in School C and the English classes in School D, showed rather definitely that greater progress was made in the supervised-study groups; four pairs showed slight variation in progress favorable to supervised study; and one pair, the United States history classes in School A, indicated that the recitation plan was superior as a method of instruction.

2. Three supervised-study classes had fewer failures than the parallel recitation classes; one had the same number; one had more; and in the other two cases the

number of failures could not be determined from the data submitted.

3. In general, then, the objective data indicated a superiority of the supervised-study plan over the recitation plan as a method of instruction. However, the objective data were not conclusive.

IV. Summary and Conclusions

The development of the teaching function and recent social and economic changes have given rise to the movement known as *supervised study*. Since 1910 much has been written on this movement and large claims have been made for it by enthusiastic advocates, but the objective data are not determinative.

On the basis of objective, measurable results no large claims can be made for supervised study. The statistical data have been found to be very unreliable and the experimental data meager and conflicting. Moreover, no measures of reliability were used by the experimenters to establish the validity of their results.

But why has so promising an educational reform failed to justify itself on the basis of measured results? Is the underlying theory unsound? Practically all writers in this field are agreed that the movement is theoretically sound, that it is grounded in two fundamental ideas: (1) that the pupil does not know how to study and needs to be taught;

and (2) that he learns through his own reactions to subject matter. All that the teacher can do is to stimulate and guide these reactions. With respect to the first idea, it is self-evident that a pupil has to learn to study effectively just as he has to learn to spell or count. Furthermore, the investigations of the study habits of high school pupils show that they are not learning to study under the old home-study and recitation régime. There is therefore a real need for instruction in how to study. With respect to the second idea, all educational psychologists agree that learning is connection forming and that connections can be formed only by the individual's own responses to stimuli.

Evidently, then, the failure of supervised study—in so far as the movement has failed to justify itself—cannot be attributed to unsound theory but rather to misconceptions of the meaning of the movement and to inadequate administrative plans and devices. That this is the correct conclusion the following chapters will attempt to show, particularly chapter II on the Meaning of Supervised Study, and chapter III on the Administration of Supervised Study.

CLASS EXERCISES

1. Read and evaluate one theoretical article on supervised study.

2. Write a summary and critical review of one of the statistical studies.

3. Write a critical review of one of the experimental studies.

4. What conclusions may be drawn from the studies reviewed in this chapter?

5. Write a summary of the main points in the chapter.

6. Should supervised study be abandoned as a method of instruction? Make a brief of the arguments for or against this proposition.

7. Explain why supervised study has failed to justify itself on the basis of objective data.

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CHAPTER II

THE MEANING OF SUPERVISED STUDY

Questions to Be Kept in Mind When Reading

1. What is the meaning of supervised study?
2. What is the meaning of study?
3. What is the fundamental idea and what are the main factors in any type of supervision?

It is the purpose of this chapter to set forth as clearly as possible the meaning of supervised study. There has been an almost hopeless confusion as to the meaning of the term. To one it may mean keeping order in a study hall; to another, a period set apart for study under the immediate direction of the teacher of the class; to still another, studying with the pupils. The term has been used to designate activities so widely different as policing a study hall and effectively directing the learning activities of a class or group of pupils. In treating the administration of supervised study Hall-Quest[1] discusses the following plans:

1. The assembly-hall study period
2. The conference period
3. The study coach
4. General directions for studying

[1] Hall-Quest, A. L. *Supervised Study.* Chap V. The Macmillan Company, New York. 1916.

5. The divided- or double-period plan
6. Daily or weekly supervised study periods
7. Assistance to weak and retarded pupils

Each of these plans is included under the term *supervised study*.

Brownell[1] lists fourteen distinct types of supervised-study technique. In summarizing his investigation of the forms of supervised-study technique, he says:

> The inferences from such a survey are that, on the administrative side, the term "supervised study" means nothing at all specific, definite, or clear, and that any general statements made about it as a single, simple form of school practice must be critically examined.

Obviously, then, one cannot assume that the term has any definite connotation. The question may well be raised, What does supervised study mean? In the following pages this problem will be approached through (1) excerpts from writers on supervised study, (2) the replies of teachers and administrators to a questionnaire, and (3) comparison with other types of supervision.

I. Excerpts from Writers on Supervised Study

Although many writers in this field have made no attempt to define supervised study or to state the

[1] Brownell, W. A. *A Study of Supervised Study.* Chap. II. Bulletin No. 26. Bureau of Educational Research, University of Illinois, Urbana. 1925.

specific meaning of the term, a search through the literature of the subject has brought to light a few statements bearing directly or indirectly on its meaning. The following quotations are typical. Some of them, taken out of their context, do not adequately represent the views of their authors. In order to comprehend their full meaning it will be necessary in each case to consult the text referred to in the footnotes.

1. It should be noted, however, throughout the book, that supervised study is interpreted to mean that method of instruction by means of which the teacher so presents the subject matter in hand that every pupil is given an adequate opportunity to understand and master the various problems.

From one angle supervised study is simply an elaborate and coöperative assignment. The next lesson is made so clear and so much time is given to each pupil to grasp its details that everyone has a maximum chance to learn the lesson.—HALL-QUEST.[1]

2. Some educators confuse supervised study with teaching pupils how to study. The latter relates to the *how*, the first to the actual *doing*. To teach pupils how to study is time well spent. However, teaching pupils how to study is not supervised study. Supervised study will often reveal among other things the need of instruction in how to study. The purpose of making these obvious distinctions is to show that supervised study,

[1] From Hall-Quest, A. L. *Supervised Study*. Preface. By permission of The Macmillan Company, publishers, New York. 1916.

when not confused with something really difficult, is a very simple thing to put in operation.—BROWN[1]

3. Our plan briefly stated is that we divide the day into five periods of eighty minutes each. Each period is divided into two parts, the first forty minutes being devoted to the recitation and the remainder to study under the direction of the teacher. . . . We do not pretend to do away with home study but we try to reduce it to a minimum.—ERICKSON[2]

4. The two general instructions usually given for conducting supervised study are, first, to find the source of the difficulty of the pupil who is struggling with the lesson, and, secondly, to guide him properly *without giving too much assistance.* Each pupil's problem is worked out with him individually as far as possible and is not permitted to interfere with the work of the class as a whole. The brighter pupils are given extra assignments which encourage them to work up to their capacity.—COLE[3]

5. Supervised study is a daily undertaking. Every period of the day is organized for the purpose of directing the details of the learning process. Studying is regarded as working on a job under the direction of the superintendent of the shop. . . . The hours wasted in ignorant, haphazard, discouraging and, all too often, unsuccessful home study are spent in class study periods, where a wise teacher directs the learning of a new assignment and reduces to an inevitable minimum the difficulties encountered in mastering a topic or a problem.

[1]Brown, H. G. "Supervised Study in the Schools of Lebanon, Indiana." *The Elementary School Journal.* XVI: 179, 180. 1916.

[2]Erickson, J. E. *School Review.* XXIV: 754-758. 1916.

[3]Cole, T. R. *School Review.* XXV: 331-335. 1917.

Under the organization of supervised study the pupil is shown how to study and he is supervised while he applies the principles of correct studying.—SIMPSON[1]

6. In this paper the term supervised study will refer to the attempt on the part of the individual who supervises not alone to give directions for study but also to see that such directions are specifically applicable to the subject matter in hand and are followed out by the pupil.—WILLETT[2]

7. Supervised study is the directed school activity which has grown out of the recognition of the fact that there are individual differences in pupils.—HARRIS[3]

8. An efficient program for supervised study should give every teacher the opportunity to direct personally the study of every student, every day, for every class. —MERRIMAN[4]

9. One of the most promising reforms in secondary education involves the reorganization of classroom instruction in the form of a combined recitation, teaching, and study. The term applied to the newer form of classroom instruction—supervised study—is in many respects a title unfortunately chosen. A better term would be "supervised learning." In brief the plan involves increased time allotted to the class meeting, with provision for study under the direct supervision of the class teacher. Introduced at first for the primary purpose of providing opportunity for study under favor-

[1] From Simpson, Mabel E. *Supervised Study in History*. Chap. I. By permission of The Macmillan Company, publishers. New York. 1918.

[2] Willett, G. W. *School Review*. XXVI: 259-272. 1918.

[3] Harris, C. L. *School Review*. XXVI: 490-510. 1918.

[4] Merriman, E. D. *School Review*. XXVI: 35-38. 1918.

able conditions and of affording opportunity to train pupils in the art of study, it bids fair to revolutionize the class meeting into a vastly more effective instrument of education.—INGLIS[1]

10. Ordinarily the long period may be divided into three distinct parts, recitation, assignment, and supervised study. The teacher should have these divisions clearly in mind. They may be defined as follows: The recitation is that portion of the period where the attention of all the pupils is directed to the definition of that part of the subject of the day which is unknown; assignment is that portion where the attention of all is directed to the definition of the limits of the advanced lesson and the suggestions for attacking it in the most economical way; supervised study is that part where the teacher gives attention to the individual in his attempt to master the assigned lesson.—FARNHAM[2]

11. Among the latest of these efforts at securing a closer, a warmer, and a more sympathetic, and in many cases a more magnetic relationship between the teacher and the student, or pupil, is supervised and directed study. We are not attempting to define this by a dictionary definition. It represents a method of instruction, a scheme of teaching, which is based upon a mutual relationship, a mutual obligation existing between the two parties concerned.—BROWN[3]

12. Supervised study is studying *with* the child, not

[1]Inglis, A. *Principles of Secondary Education.* pp. 713-715. 1910. Used by permission of, and arrangement with, Houghton Mifflin Company, the authorized publishers, New York.

[2]Farnham, C. E. *Education.* XL: 171-180. 1919. The Palmer Company, Boston.

[3]Brown, J. S. "Supervised and Directed Study." N. E. A. Reports. LVII: 594-597. 1919.

for the child; thinking *with* the child, not *for* the child. This is especially true in the lower grades where teachers must study the lessons with the children. I may add that teachers need to do more of this, for one of the very best ways to teach a child to study is to study with him. In other words supervised study means the intelligent direction of the child's activities in the preparation of assigned tasks.—Ross[1]

13. Supervision of study means:
Correcting the defects of mass teaching;
Individualizing instruction;
Recognizing the psychology of individual differences;
Supervising study in the teacher's classroom;
Directing the pupil's effort;
Anticipating the pupil's difficulties;
Working *with* the pupil, not *for* him;
Helping the pupils judiciously;
Training pupils in how to study;
Making a real laboratory of every classroom;
Increasing the importance of assignment—so much so that supervised study has been described as giving an elaborate and coöperative assignment;
Devoting most time to the lower half of the class;
Giving extra work or practicing the doctrine of the limitation of training in the case of the highest third;
Increasing the amount of school study.—Breed[2]

[1]Ross, Carmen. *Education*. LIX: 457-470. 1919. The Palmer Company, Boston.

[2]Breed, F. S. "The Measured Results of Supervised Study." *School Review*. XXVII: 186-204. 1919.

14. Supervised study is used here to mean every phase of the teacher's work that aids the pupil in the mastery of subject matter, formation of study habits, putting forth consistent effort in the study of the subject and in developing power of analysis, technique of organization of subject matter, and ability to apply knowledge to new situations.

The teacher should be trained to direct the study of his pupils chiefly through recitation demands that utilize and capitalize the preparation the pupils have been directed to make; and by making most recitations a continued study of the lesson. Where a separate period is used for supervised study the teacher should master the technique of directing group study.—NUTT[1]

15. Careful assignment, during which the preparatory steps are taken, is essential to the development of right habits of study and is therefore an integral part of study supervision. It is equally essential that study should culminate in expression, and the review period during which the results of silent reading are presented and reorganized by the class affords opportunity for the completion of the process. The technique of both assignment and review must therefore receive consideration in any discussion of supervised study.—MCGREGOR[2]

Conclusions. What then do the writers say supervised study is? What conclusions may be drawn from the foregoing statements?

[1]Nutt, H. W. *The Supervision of Instruction.* pp. 181-190. 1920. Used by permission of, and arrangement with, Houghton Mifflin Company, the authorized publishers, New York.

[2]From McGregor, A. Laura. *Supervised Study in English.* Chap. I. By permission of The Macmillan Company, publishers, New York. 1921.

1. Obviously, there is no fundamental element common to all these statements. In other words, there is no well-established definition of the term supervised study. On the contrary confusion with respect to its meaning is evident.

2. Attention to individual needs is emphasized as an essential element by Cole, Harris, Farnham, and Breed. (See excerpts 4, 7, 10, and 13.)

3. The divided-period plan—usually assignment, silent study, and recitation—is advocated by Hall-Quest, Erickson, Simpson, Inglis, Farnham, Breed, Nutt, and McGregor. (See excerpts 1, 3, 5, 9, 10, 13, 14, and 15.) In fact, a large percentage of all the writers advocate the divided-period plan in some form. This appears to be the idea best established.

4. A brief statement of the meaning of supervised study, based upon the ideas most emphasized in the foregoing paragraphs, might take the following form: Supervised study is a scheme of instruction in which the class period is divided into three parts: (1) the assignment; (2) silent study with the teacher giving individual help; and (3) the recitation.

5. But a careful examination of the literature of the subject reveals an evolution of the concept of supervised study from the early attempts of Earhart, McMurry, Reavis, and others to teach pupils how to study toward the idea that supervised study means the *effective direction of all the learning activities of pupils*. Apparently, the workers in this field are discovering that the early view was too narrow and restricted and that supervised study cannot succeed if it is subordinated to the recitation and to old-fashioned methods of teaching. For example, Inglis suggests that "supervised learning"

would be a better term to describe the movement and Nutt states that supervised study refers to every phase of the teacher's work designed to aid the pupil in the mastery of subject matter and the development of proper habits of study. Similar statements may be found also in the writings of Hall-Quest, Mabel Simpson, and A. Laura McGregor.

II. Replies to Questionnaire on Meaning of Supervised Study

In order to obtain some data on how teachers and administrators are reacting to the supervised-study movement a question blank was sent out to four hundred teachers and school administrators representing all the distinctive sections of the state of West Virginia. In making out the list of those to whom question blanks were to be sent, care was taken to include all classes of teachers and administrators from the humblest rural teacher to a normal school president. Replies were requested on the following points:

1. Education and experience.
2. Do you have supervised study in your school?
3. State as clearly as you can your idea of what constitutes supervised study.
4. How do you conduct supervised study?

The question blank was arranged in convenient form and ample space was allowed for the replies. Responses were received from 274 of the 400 per-

sons to whom blanks were sent. The results are summarized in Tables XI and XII.

TABLE XI. SHOWING THE EDUCATION AND EXPERIENCE OF THOSE REPLYING TO THE QUESTION BLANK

EDUCATION		YEARS OF EXPERIENCE	
Elementary school only	42	1 to 5	142
High school graduates	48	6 to 10	76
Normal School graduates	142	11 to 15	26
College graduates	32	16 to 20	22
Unclassified	10	21 to 25	6
		26 to 30	0
		31 to 33	2
TOTAL	274		274

TABLE XII. SHOWING THE PRINCIPAL STATEMENTS AND THE NUMBER OF PERSONS MAKING EACH STATEMENT

Teacher giving individual help in the study period	54
Aid given at the end of the class period	8
Studying with the pupils	56
Helping the pupils find the most important points	30
The divided-period plan	12
Teaching the pupils how to study	42
Effective direction of all learning activities	4
Indefinite answers	38
No answer	30
TOTAL	274

It was very difficult to summarize and classify the replies. Table XII represents an attempt to express the results in brief form. It is only in a rough way, however, that the responses can be grouped as shown in this table. Each reply is classified according to the dominant idea expressed. There is much overlapping, also a variety of shades of meaning. It should be observed that thirty teachers made no attempt to state the meaning of supervised study and that thirty-eight more made statements so indefinite that they were practically meaningless. Perhaps the best way to convey an adequate impression of the character of the responses is to reproduce verbatim a few typical statements. Those that follow are typical of the replies to the request to state as clearly as possible the meaning of supervised study:

1. A student, or a class of students, working for a definite purpose under the immediate direction of a teacher or some other person. This direction may take the form of general questions, outlines, and suggestions to the class as a whole, or individual conferences and questions, or both—usually both. The director should make an effort to discover the needs of the pupil and to give help as needed. (J. B. I.)

2. Supervised study is a period given entirely to study, with the instructor giving her undivided attention to the children preparing their lessons. (S. K.)

3. Supervised study is helping the children to prepare their lessons. About one half of the period should

be used in hearing the lesson recited and the remainder of the time devoted to showing the pupils how to prepare the next lesson. (M. G.)

4. Supervised study is a division of the class period into (1) the recitation, (2) the assignment, and (3) directed study. Emphasis is placed upon the assignment and the effective direction of the pupils' efforts. (E. R. C.)

5. Supervised study is a careful observation of what the pupil is doing, with a suggestion or explanation when you notice that the pupil is using a wrong method or is unable to start the work in hand. The teacher should pass quietly about and see that each pupil is actually working to an end and using a proper method. (A. T. H.)

6. The period should be divided; e. g., into 40-20-minute sections. The 40-minute period is devoted to hearing the recitation. At the close of this period the assignment for the next recitation in the same subject is given in detail and the remaining 20 minutes are devoted to assisting individual students and occasionally emphasizing points of general importance. (D. H. P.)

7. Study for a purpose under the direction of the teacher constitutes supervised study. It means the elimination of wasted time and disorganized effort; it will result in greater concentration of effort and a livelier interest in the work. It will lead to the shortening of hours spent in home study, and to the lengthening of the school day. (C. O. B.)

8. Sound learning comes from effective study and not from listening to the teacher. Supervised study helps the pupil to avoid wasted time and effort by showing him the way to interesting and profitable schoolroom work. It helps pupils to help themselves. (E. O. R.)

9. Supervised study consists first in the proper assignment of the lesson and the careful supervision of individual pupils as they study silently at their desks. Much time should be spent in the assignment of lessons. The teacher is a director and should see that the conditions and methods of effective work are present. It is working *with*, not *for* the pupils. (M. R.)

10. Supervised study is study that has been previously planned by the teacher and undertaken by the pupils under the direction of the teacher. A clear and definite assignment should precede the study period. During the study period the teacher should pass quietly among the pupils giving individual help. (M. H.)

11. It is study so guided that the intellectual activity of the pupils, whether directed to learning new facts or establishing facts or habits through drill, is economical, keen, direct, and pleasurable. It implies guidance in getting at the essentials of any subject, in carrying on any coöperative activity, in learning economical work habits. It has specifically to do with the assignment of the lessons or work and the supervision of the study of the lesson or the doing of the work. (W. B.)

Conclusions. From a study of the foregoing excerpts, the following conclusions may be drawn:

1. Of course, the meaning of supervised study cannot be established by collecting the opinions of teachers. All we can learn from such a study is the opinions of the teachers responding. These may or may not be valid.

2. The teachers who responded to the question blanks are considerably above the average in prepara-

tion and experience in school work. (See Table XI.) More than half of them are college or normal school graduates and nearly half have had more than five years' experience. Consequently, this group cannot be considered as a fair sample of the teachers of the state or nation. They represent the upper half rather than the whole group. Nevertheless, only about 50% of this group attempt to conduct supervised study in their own schools.

3. Perhaps the most striking thing about the foregoing statements is the lack of agreement. These teachers differ widely in their views of supervised study. There are at least six different meanings or points of view expressed in the replies. (See Table XII.)

4. Teaching the pupils how to study and studying with the pupils are the ideas held by about 36% of the group. Approximately 20% conceive supervised study to be the giving of individual help in the study period.

5. A statement of the meaning of supervised study based upon the views most frequently expressed by this group of teachers would take the following form: Supervised study is the process of teaching pupils how to study by studying with them and by giving individual help in a period set apart for study.

6. A few teachers, however, think of supervised study from a much broader point of view. For them it is synonymous with directed learning. (See Table XII and excerpt 11.)

7. An examination of the foregoing excerpts, together with the statements made by the writers in this field, will establish one point; namely, that there is no well-established and generally accepted meaning for supervised study. Many think of supervised study in terms of the divided-period plan; some think of it as

teaching the children how to study; others hold still different views. Recently some, perhaps with clearer vision, are beginning to conceive of supervised study as supervised learning or as the direction of the pupil's learning activities.

Which meaning, then, shall be accepted as valid? Shall we accept the idea most frequently expressed or shall we follow the lead of the few who suggest a broader view? Doubtless better progress would be made by accepting the views of the more progressive few who interpret supervised study to mean the effective direction of the pupil's learning activities than by following the majority, whose views are likely to be superficial and erratic. As Thorndike has well said, "Truth cannot be manufactured from constant errors by getting a great number of them." Progress is made by following the *seers* rather than the crowd or even popular leaders. Moreover, as was shown in the first chapter of this book, the supervised-study movement, as commonly conceived, has failed to show any impressive results when subjected to quantitative measurements. Evidently, there is need for a revision and enlargement of the concept in order to make it more effective when put to work under ordinary schoolroom conditions. Furthermore, it will be shown in later chapters that the broader view of supervised study is effective, that it does produce superior results in the classroom.

III. Supervision of Study Compared with Other Types of Supervision

The consideration of the ordinary meaning of the term "supervision" should be a distinct aid in revising and enriching the concept of supervised study. Two types of supervision will be considered: the supervision of industrial activities and the supervision of instruction.

1. Supervision of Industrial Activities

Perhaps the easiest approach will be through a concrete case of industrial supervision. Hollingworth and Poffenberger[1] describe an interesting case of this type of supervision in Gilbreth's classical study of bricklaying operations. The aim of this study was to improve the efficiency of a group of men engaged in bricklaying. Gilbreth's first step was to observe the men at work in order to discover the sources of wasted time and energy. He noted how these men arranged their material and how many separate movements they made in laying a brick. Then he made a careful study of the situation to discover the best arrangement of material and the best method of procedure for a group of men engaged in laying brick. Finally he taught the men the plan he had worked out. The results were almost unbelievable. The efficiency of the

[1] Hollingworth, H. L. and Poffenberger, A. T. *Applied Psychology*. p. 227. D. Appleton and Company, New York. 1917.

group increased from 120 bricks per hour per man to 350 per hour, the number of movements decreasing from 18 to 4 In this case supervision increased the efficiency of the workers nearly 200%.

Now what are the essential factors of the supervision of industrial activities as they stand revealed by the study of the foregoing illustration? Briefly, they may be summarized as follows:

a. Surveying the activities of the workers in order to discover the methods employed and to locate the sources of wasted time and effort

b. Working out a plan of scientific procedure which will result in the elimination of wasted time and effort

c. Teaching the improved plan—the scientific method of procedure—to the workers, thus improving their efficiency

2. Supervision of Instruction

Dr. M. S. Pitman's[1] supervision of rural schools by the zone plan may be taken as a typical example of the supervision of instruction. Of course, this case is not typical of that type of activity ordinarily called supervision, for most so-called supervision of instruction is merely inspection. It is typical, however, of real supervision. The zone plan, as described by its author, consists of the following activities:

[1] Pitman, M. S. *The Value of School Supervision.* Warwick and York, Inc., Baltimore, Md. 1921.

A. A calendar of events for the year:

1. A schedule of supervisory tours
2. The time and place of holding teachers' meetings

B. A supervisory tour:

1. Observing three or more classes—primary, intermediate, and upper grades
2. Making a talk to the school
3. Holding a brief conference with the teacher
4. Playing with the children
5. Visiting the patrons of the school

C. Group teachers' meetings which usually consisted of the following exercises:

1. A teaching demonstration by the supervisor
2. A discussion of this demonstration
3. A teaching demonstration by two group teachers
4. A discussion of these demonstrations
5. A general discussion of the teaching of the subject under investigation

At the close of each meeting the supervisor gave to the teachers a list of suggestions for their guidance during the following month.

A careful analysis of the foregoing activities will reveal the following fundamental elements in the supervision of instruction:

a. A definite plan for the direction of the teachers in the zone, including explicit directions for the teaching of one subject—the special subject under investigation

b. The observation of the teachers at work, including the visiting of classes and demonstration teaching, followed by conferences and discussions

c. Teaching the teachers, according to their needs, more effective methods of instruction

If now we compare the supervision of industrial activities with the supervision of instruction, we find that the same fundamental processes are involved in each case and in the following order:

1. Forming a definite, scientific plan of procedure
2. Making observations to determine the needs of those being supervised
3. Instructing the workers in the more scientific methods of procedure

Evidently, the most fundamental element in all supervision is the direction of activities. It is the function of supervision to give effective direction to activities. Similarly, supervised study should be thought of as the effective direction of the pupil's learning activities.

Spelling as an illustration. Let us apply this idea of supervised study to spelling. The first step would be the making of a definite plan for directing the study of spelling. This plan should be based upon the best material available on economical methods of studying spelling and might take the following form:

1. Test the class with the Ayres Spelling Scale, selecting twenty words from the appropriate column. Keep

a record of individual scores. If the teacher so desires she may use some other standard test.

2. Let each pupil know his standing on this initial test and keep him informed of his progress by checking up his work daily and weekly. Plot learning curves based upon the weekly scores, showing the highest, median, and lowest scores.

3. Find out how the pupils study a spelling lesson; then teach them, according to their needs, the most economical method of learning to spell. To this end the process may be as follows:

1) Test each word list when assigned for study.
2) Teach the meaning and use of words not already known. In this connection teach the use of the dictionary.
3) Provide a study period as a part of the class period or as a special study period.
4) Teach the pupils to concentrate in the study period on the words missed in assignment test.
5) In studying difficult words direct the pupils to proceed in this manner:
   a. Learn to pronounce the word correctly.
   b. Look closely at the word; then close the eyes and try to recall how it looks.
   c. Look at the word again, pronouncing the syllables distinctly.
   d. Write the word without looking at it, then check by the correct form. Repeat this writing and checking by the correct form until the word can be written correctly from memory.

4. Provide frequent reviews, especially of difficult

words. Teach the pupils to review frequently in their study periods, particularly the words missed in the assignment test.

5. Set up definite goals to be attained, as, for example, the making of a certain score on the standard test by the end of the school year or the making of a certain percentage on the daily lesson. These goals should be set higher from time to time as the pupil is able to attain them.

6. Insist on pupils following the directions for study until the proper habits of study become well established.

7. At the end of the school year repeat the standard test as a means of measuring the progress of the class.

The second step would be to observe the pupils' method of studying in order to determine to what extent they are proceeding according to the foregoing plan. Assign a lesson of ten or more words and note how the pupils react in the study period. Additional data may be obtained by asking them what they did in preparing the lesson. Thus the teacher should check up on the study habits of the pupils, discovering their needs.

Finally, the teacher should instruct the pupils, according to their needs, in the most economical methods of studying spelling. Definite directions for study should be given and the study period closely supervised until the pupils are thoroughly habituated in the proper methods of procedure in preparing the spelling lesson.

IV. The Meaning of Study

Study is a term that connotes a variety of meanings, such as memorizing selections, reading a text or reference material, forming habits, reflective thinking, and experimentation. Throughout this book, however, study is synonymous with learning or attempting to learn. It is applied to all the ordinary schoolroom activities, whether the aim is the formation of habits, the assimilation of material from the printed page, the appreciation of a picture or poem, or the solution of a problem.

V. Summary and Conclusions

The quotations from writers in the field of supervised study, as well as the statements of teachers, show that there is no well-established meaning for supervised study. On the contrary, confusion with respect to the meaning of the term reigns supreme.

Supervision in connection with study should mean the same as it does in the supervision of industrial activities or the supervision of instruction. Study is used throughout this text to refer to all the usual schoolroom activities. It is synonymous with learning or attempting to learn.

From the point of view of the most progressive writers and teachers, supervised study may be defined as the effective direction of all the pupil's learning activities. Such supervision consists of the following factors:

1. The making of a definite plan for directing the learning of a subject, basing this plan on the best available material, such as experimental investigations and the best books on the teaching of the subject under consideration.

2. The observation of the pupils engaged in study to discover their present methods of studying, thus determining their needs.

3. The instruction of the pupils, according to their needs, in the most effective methods of studying and closely supervising them until proper habits of study are firmly established.

Finally, the material of this chapter, together with the data in chapter I, suggests strongly that the concept of supervised study must be revised and extended in order to rescue the movement from the clutches of formalism and superficiality. Some will object to this revision, however, because their concepts have petrified. To such persons the adoption of a new term is more feasible than a revision of the old. For the benefit of this class a new term is suggested as a substitute for *supervised study;* namely, *directed learning.* All who prefer may substitute *directed learning* for *supervised study* throughout the remainder of this book. To the writer, however, it seems preferable to retain the old term, revising it in the light of new knowledge, simply because it is in common use and because it leads the teachers to think of the learning situation from the

viewpoint of the child—from the viewpoint of how to study rather than how to teach.

CLASS EXERCISES

1. What is the aim of this chapter?
2. Make a sentence outline of the important points.
3. Which quotation from the writers on supervised study is the best statement of the meaning of the term?
4. Select from the teachers' statements the one representing the most modern view of supervised study.
5. Trace the evolution of the meaning of supervised study through the available books and articles appearing on methods of study and supervised study from 1905 to the present time.
6. Write a definition of supervised study based upon the views most frequently expressed by teachers and writers. Write a second definition based upon the views of the most recent and best-informed writers. Which definition is the more reliable? Why?
7. Outline the processes involved in the supervision of study.
8. Criticize the plan for supervising the study of spelling. Make a similar plan for handwriting, arithmetic, or some other subject.
9. How has the study of this chapter modified your concept of supervised study? Write out a statement of your present views.

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(Attempts to define the supervision of instruction. The study employs the questionnaire method.)
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Elementary School. Chap. I. New York: The Macmillan Company. 1924.

(A good discussion of the meaning of study and of the broader meaning of supervised study.)

10. McGregor, A. Laura. *Supervised Study in English.* Chap. I. New York: The Macmillan Company. 1921.

(Defines study as synonymous with thinking. Considers the aims and objections to supervised study. Favors differentiated assignments.)

11. Nutt, H. W. *Principles of Teaching High School Pupils.* Chap. X. New York: The Century Co. 1922.

(Discusses the meaning and technique of supervised study.)

12. Pitman, M. S. *The Value of School Supervision.* Baltimore, Md.: Warwick and York, Inc. 1921.

(Describes the zone plan of supervision. An experimental study. Outlines definite supervisory activities.)

13. Simpson, Mabel E. *Supervised Study in History.* Chaps. I and II. New York: The Macmillan Company. 1918.

(Chapter I, an introduction by the editor, advocates fitting the school to the child.)

(Chapter II discusses the recitation period and advocates three divisions: review, assignment, and study.)

14. Sumner, S. C. *Supervised Study in Science and Mathematics.* Chap. I. New York: The Macmillan Company. 1922.

(An introduction by the editor. Makes a strong plea for supervised study.)

CHAPTER III

ADMINISTRATION OF SUPERVISED STUDY

Questions to Be Kept in Mind When Reading

1. Why has supervised study failed to produce measurable results?
2. What preparation does the teacher need in order that she may conduct supervised study successfully?
3. How should supervised study be conducted in the elementary school? The one-teacher rural school?
4. How should supervised study be conducted in the high school?
5. How may a school be organized on the Dalton Plan?

The aim of this chapter is to set forth a general plan whereby supervised study can be conducted with results superior to those attained by the older form of teaching. The critical review of the literature of supervised study in chapter I led to the conclusion that the movement has thus far failed to show any appreciable gains in the form of quantitative data or measurable results. Nevertheless, it is generally agreed that the theory of supervised study is sound. Perhaps all who have given the processes of teaching and learning any serious thought would subscribe to the two fundamental ideas

underlying the supervised-study movement: namely, (1) that the pupil learns through his own reactions to the materials of education and not through the pouring-in process on the part of the teacher, and (2) that the function of the teacher is to stimulate and guide the pupil's reactions. Why, then, has the movement failed to produce measurable results? Before presenting a constructive program for the conduct of supervised study we shall do well to turn our attention to the factors that have hitherto robbed the movement of its vitality. Thus we may profit by the mistakes of the past. To be sure, a movement that is sound in theory ought to be able to demonstrate its worth.

I. Failure of Supervised Study to Produce Measurable Results

A critical study of the periodical literature on supervised study fails to show any distinct advantage in favor of this type of classroom procedure. Although one cannot read the experimental literature without feeling that he is justified in believing in the comparative superiority of supervised study over the older recitation plan, it must be admitted that there is not much valid evidence for this point of view. The explanation is not far to seek.

1. There has been an almost hopeless confusion as to the meaning of supervised study. In many cases narrow and artificial systems have been followed.

Too often those who have claimed to be conducting supervised study have been merely policing a study hall or teaching a few general rules for study. This point has been fully elaborated in chapter II.

2. The learning processes have not been analyzed and a definite technique worked out for directing each type of learning. In many instances those attempting to conduct supervised study have not known the essential processes involved in habit forming, in reading, in problem solving, and in appreciation. Consequently, they could not give effective direction to the pupils' reactions in any of these classroom activities. A few general rules for studying have been taught but these are not equally applicable to all types of learning. Furthermore, the pupils did not know when and how to use the rules. Obviously, supervised study is doomed to failure unless the teacher knows how to direct the pupils' reactions in each of the typical classroom exercises. The significance of this point will be apparent after the reader has digested the contents of chapter IV, in which an attempt will be made to analyze the manifold activities of the schoolroom into a few typical exercises.

3. Most teachers have not been trained in the principles and technique of supervised study. They have been trained to *teach*, to present material to the pupils, "to spray them with ideas." Both the viewpoint and technique of supervised study are essen-

tially different, however, from those of the older forms of teaching. The difference is so great that it is futile to expect a teacher trained in the old order to be an expert in conducting supervised study. A somewhat elaborate training is needed to prepare teachers to direct effectively all the learning activities of pupils. Teacher-training institutions have not until recently, if at all, provided this training. In the following chapters an attempt will be made to present some material for just such a course of training.

4. In many cases supervised study has been subordinated to the formal recitation. Teachers have retained the older ideas of teaching and have made supervised study largely a period of silent study in preparation for the recitation. Not much can be expected from this narrow and artificial view of supervised study. Nevertheless, such is the view held by no inconsiderable number of teachers and writers. They make an artificial division of the class period into recitation period and study period and think of the study period as the time and place to prepare for the formal recitation. If supervised study is to produce useful results, however, the recitation must be thought of as merely a device for providing direction to the pupil's study. Supervised study must begin and end with the opening and the close of the class period.

5. Perhaps some of the best work that has been done in the field of supervised study has not been subjected to quantitative measurement. This is only a conjecture, for the only way that we can be sure that unusual results are being attained is to subject these results to reliable quantitative measurements.

It will thus be seen that there are good and sufficient reasons why supervised study, though sound in principle, has not contributed much to educational reform. On the other hand, belief in the merits of the movement is justified for the following reasons: (1) practically all the leading thinkers in the field of method agree that supervised study rests on sound principles, and (2) that supervised study, conceived as the effective direction of the pupil's learning activities and properly conducted, does produce superior results, as will be shown in the last chapter of this book. The meaning of the term has been elaborated already; how to conduct supervised study will engage our attention throughout the remainder of this chapter.

II. How to Conduct Supervised Study

1. Preparation of the Teacher

1. The teacher should conceive of supervised study as the effective direction of all the pupil's learning activities. Effective direction is the end and aim of

supervision. The teacher must have not only an adequate conception of the broader meaning of the term but also a clear vision of the main processes constituting supervised study; namely, (1) making a definite plan for directing the work, (2) observing the pupils at their work to discover their needs, and (3) teaching them the most economical methods of procedure in that particular type of work. With this broad conception of her task and an adequate comprehension of the objectives to be attained, the teacher is ready to go forward with her preparation for the art of supervising study. (See chapter II.)

2. *The teacher must have a thorough knowledge of how pupils learn.* She must ever bear in mind that pupils learn through their own reactions to subject matter. It cannot be said with too much vigor and emphasis that ideas, attitudes, and skills cannot be extracted from the teacher's nervous system and transplanted to the nervous system of the pupil. Connections in the pupil's nervous system can be formed or strengthened only through his own responses to stimuli. In addition to these fundamental ideas the teacher should have a fair knowledge of the psychology of the learning processes, of the way in which habits are formed, ideas acquired, and attitudes and beliefs established. To this end she should analyze the activities of the

schoolroom into a few types of learning and work out the essential factors of each type. (See chapters IV, V, VII, IX, and XI.)

3. The teacher should analyze the subject being studied from the viewpoint of the chief types of learning involved and provide for the essential factors of each type. For example, arithmetic involves principally two types of learning: (1) habit forming in learning the fundamentals and (2) reflective thinking in the solution of problems. The effective supervision of the study of arithmetic requires, therefore, knowledge of the essential factors of habit forming and of problem solving and skill in providing for these factors in directing a class in the study of this subject. Likewise, the other school subjects should be analyzed into their chief types of learning and the essential factors provided for in directing the pupil's study. (See chapters IV, VI, VIII, X, and XII.)

4. The teacher must have as a part of her equipment a definite plan for directing the study of each subject. These plans should be based upon the best available material relating to the processes of habit forming, of reading, of problem solving, or of appreciation. They should provide in each case for all the essential factors of each of these types of learning as they relate to the subject under consideration. (For an example of such a plan see pp. 59-61.)

2. Organization of a Class for Supervised Study

With the equipment outlined in the foregoing paragraphs the teacher may proceed with confidence to organize her class for the administration of supervised study. The old division of the class period into two distinct phases—the recitation and supervised study—must be discarded and the direction of the pupil's learning activities accepted as the guiding idea. The divided-period plan of supervised study must be abandoned in favor of a more flexible program of study under the guidance of the teacher. The class period may well be divided into the following phases, but no time limits should be assigned to these divisions:

1. *The assignment.* This should (1) set definite tasks to be performed, (2) locate and define problems to be solved, (3) give definite directions for study, and (4) provide motivation.

2. *The pupils' reaction to the assignment.* The reaction may consist of silent study with the teacher giving individual help, a coöperative attack upon the problem under the guidance of the teacher, or home study, or library work.

3. *Checking up on the progress of the pupils.* This step may take the form of summaries, tests, group discussions, reports of the work accomplished by members of the class, or the clarification of obscure points.

In some cases a whole period may well be devoted to locating and defining a problem and planning

methods of attack on this problem. Then several periods may be required to reach a solution of the problem. The work accomplished should be summarized and otherwise checked up at frequent intervals but not necessarily in every class period. In other words the division of the class period must be adjusted to the progress of the work instead of the work's being adjusted to correspond to the artificial divisions of time. To be sure, some teachers will spend most of the time talking to the pupils—asking questions and answering these questions themselves—if no time limits are fixed for each division of the class period. On the other hand, it is futile to try to constrain this type of teacher to conduct supervised study, for she fails to grasp the fundamental ideas underlying the movement. Her activities cannot be regulated by the clock. The only remedy is training in the principles and technique of supervised study.

Supervised study cannot be administered strictly according to any one set of specifications. The administrative devices employed must be determined largely by the general organization of the school. The following plans are intended to be merely suggestive. Before any plan can be put into successful operation it must be adapted to local conditions. The more specific suggestions for organizing a group for supervised study will be treated under

two main headings: (1) the elementary school and (2) the high school.

The Elementary School

In the elementary grades most of the studying should be done at school and under the immediate direction of the classroom teacher, little home work being required. The problem in the town and city schools, in which there is at least one teacher for each grade, is how to organize a grade for the supervision of study. Several plans are practicable.

1. The three-group plan. In organizing a grade on this plan the teacher may proceed as follows:

a. Divide the class into three sections, approximately equal in numbers and in ability to learn, on the basis of previous marks and the results of intelligence tests.

b. Plan the work so that these sections may progress at different rates in most subjects. In a few subjects, such as penmanship, spelling, music, drawing, and the fundamentals of arithmetic, the three sections may all work together. In these subjects the work can be so arranged that each pupil progresses at his own rate without interfering with the progress of other pupils.

c. Arrange a short recitation period and a longer class period for each section. These periods should be short, five to ten minutes in the primary grades, and should be gradually lengthened from the first to the eighth grade. Perhaps in the upper grades the periods could be lengthened to fifteen minutes for recitation and thirty minutes for study in each section. Then forty-five

minutes would be required for each subject in the program in which the three sections are taught separately. By combining all the sections in a few subjects, as suggested under *a* time may be found for a full program of subjects without lengthening the school day. In the upper grades, however, an extra period may well be added to the school day or some home study may be required.

d. Assign work to each section according to its ability. Make these assignments definite, setting exercises to be done or problems to be solved. Give specific directions for study and plan methods of attack on the work to be accomplished. Making the assignment, however, is not wholly a teacher's function. The pupil should coöperate with the teacher in locating and defining problems and in planning methods of attack.

e. After the pupils have had an opportunity to work on the assignment check up on what has been done, requiring them to summarize the results of their study, correct errors, and evaluate conclusions.

f. When the work is under way the first part of the recitation should be used in checking up on the results accomplished in the previous study period and in outside study and the remainder in assigning the work for the study period to follow immediately. But there should be no fixed time limits for any part of the class period. The amount of time to be given to each function must be left to the judgment of the teacher.

2. Differentiated assignments. If it is not feasible to divide the grade into three sections the teacher may make a differentiated assignment to the whole group; that is, a minimum, an average, and a maxi-

mum assignment. The minimum assignment should be sufficiently easy for the slow pupils to complete it with reasonable effort, the maximum assignment difficult enough to keep the brightest pupils busy. Encourage each pupil to do all that he can in the allotted time; then group the pupils for each recitation according to the work they have accomplished.

Divide the class period between recitation and study, allowing as much time as possible for study. Since the classes will be larger than in the three-group plan the recitations should be longer. This leaves less time for study. Consequently, more home study should be required, particularly in the upper grades. In general, the work should be directed as described under the three-group plan with respect to the main features of the class period: assignment, study, checking up on the progress of the pupils.

3. The Dalton Plan. The Dalton Plan of school organization lends itself readily to the supervised study method of teaching. In fact, the Dalton Plan cannot be operated successfully unless the teachers know how to direct the study of pupils. Supervision is provided through the assignments, the directions for study, the references, and the individual and group conferences. This plan will be described more fully in the following section, which pertains to supervised study in the high school.

In all the foregoing plans the classrooms must be equipped with reference books, supplementary texts, and dictionaries. These should be readily accessible to the pupils. The classroom must be made over into a workshop or laboratory.

The rural school. The rural one-teacher school is but a special case of the elementary division. If all grades are represented this type of school presents a difficult problem because of the larger number of classes that must be organized. Furthermore, each pupil must spend approximately seventy-five per cent of his time studying at his seat without the immediate oversight of the teacher. Short recitation periods and long study periods are necessary features of a well-organized rural school. Thus it will be seen that supervised study with its short recitations and its longer study periods is the only feasible plan of class organization in the rural school. In fact, a rural school cannot be taught with much success without supervised study in some form. The time spent in study must be directed effectively if the best results are to be achieved. The usual plan of organization does not need to be changed materially. All that is necessary is that the teacher learn how to direct effectively the work of the pupils who are studying at their seats. This direction may be accomplished largely through the assignment, in-

cluding directions for study, and through the checking up process.

The High School

Supervised study may be conducted fairly well in the high school without changing the usual schedule of classes or the length of the class periods. Many high schools are organized on the basis of six or seven periods of forty-five minutes each. A pupil is permitted to enroll for four or five units of work. Each student spends four or five periods in the classrooms and two or three periods in the general study hall or in the library. In a school so organized the recitation periods should be used largely in assigning work and in checking up on the progress of the pupils, the study being done in the extra periods and at home. If definite assignments are made, including specific directions for study, and the work is carefully checked, fairly good results may be achieved. Frequently the whole period should be devoted to a study lesson, the chief aim of which should be to teach the pupils how to study. But this organization is not by any means the best for the administration of supervised study. The plans that follow would yield better results.

1. **The lengthened-period plan.** In organizing a grade on this plan the teacher may proceed as follows:

a. Divide the school day into four or five periods of sixty-five to seventy-five minutes each and one period of forty-five minutes. The short period may be used for general assembly, extra-curricular activities, and extra study periods.

b. Enroll each pupil for four units of work and let the amount of credit depend upon the quality of his work. For example, credit may be given according to the following scheme:

Grade	Credit
A. Very Superior	1.2 units
B. Superior	1.1 units
C. Average	1.0 unit
D. Inferior	.8 unit
E. Very Inferior	.5 unit
F. Failure	.0 unit

If this scheme is adopted the distribution of the grades of the various teachers should be made to approximate the following standard: A, 5% of the class; B, 20%; C, 50%; D and E together, 20%; and F, 5%. This would limit the extra credit to the upper fourth of each class. As a result only the more capable pupils would be able to earn the extra credit. On the other hand, credit for quality penalizes the slow pupils by requiring them to spend five years or more on a four-year course. This objection may be overcome, however, by allowing those who make a grade of D (the E-grade being dropped) full credit for the course.

c. Devote a part of the class period to recitation and a part to study under the immediate direction of the classroom teacher. Assign no time limit to the recitation but reserve the greater part of the period

for study. On an average not less than forty-five minutes of a 75-minute period should be spent in study but there should be no arbitrary division of the time from day to day.

d. Use the recitation time in making definite, differentiated assignments and in checking up on the work accomplished in the study period. After the work is in progress the first part of the recitation should be devoted to the checking-up process—requiring outlines, summaries, and written reports; correcting errors and clarifying difficult points; evaluating conclusions; while the latter part is used in the assignment of advanced work. The assignment should give a definite task to be performed or set up a problem to be solved and should include specific directions for study. Then the rest of the period may be spent in working on the assignment, unfinished work being completed at home or in an extra study period.

e. The study period may be devoted to silent study, with the teacher giving individual help, or to group work, or to a coöperative attack on the assignment under the direction of the teacher. Pupils failing to complete the work in the study period might do additional work at home but home study should be reduced to a minimum and not *required* of all.

The foregoing plan has two outstanding features: (1) it eliminates the general study hall, which has never been anything better than a necessary evil, and provides for study under the teacher of the subject—the only one who can effectively direct the study of a group of pupils—and (2) it puts a premium on good work through credit for quality.

Another form of the lengthened-period plan provides for five or six periods of sixty to seventy minutes each. Under this plan the more capable pupils—and not infrequently the less capable—are permitted to enroll for five units of work. The pupil spends his extra study periods in the library or general study hall. Otherwise this plan differs but little from the one outlined in the preceding paragraphs.

2. **The Dalton Laboratory Plan.** This plan is a radical departure from traditional high school organization and administration. The usual timetable is discarded and each pupil is given considerable freedom in planning and executing his work. He may spend a whole day on one subject if he likes—then turn his attention to another subject on the following day. Thus a pupil may distribute his time among his subjects according to his own plan. Individual differences are well provided for and at the same time the pupil functions normally as a member of the group. His group relationships lose much of the usual schoolroom artificiality because they grow naturally out of the environment in which he lives and works.

Briefly, the main features of the Dalton Plan are:

1) Each schoolroom becomes a laboratory or workshop, and there should be a room for each subject in the curriculum. In a small school, however, two subjects

may be studied in a single room or laboratory. The reference library should be distributed among the rooms according to the subjects of study in the various rooms, for it is essential to the success of this plan that these books be readily accessible to all the students.

2) The pupil is free to pass from room to room and to distribute his time according to his plan but he is held responsible for the completion of a definite amount of work in a given time. He may work as an individual or as a member of a group. Thus freedom and co-operation are two cardinal principles of the Dalton Plan.

3) Assignments are made in the form of contracts, challenges, or problems. The success of the plan depends largely upon the character of these assignments. They should be in written form and clear and definite. There should be a foreword or introduction, which will arouse interest and create a desire to attack the exercises or problems of the assignment. Definite exercises, questions, and problems should be required, references given, and specific suggestions for study included. Usually the assignment outlines a month's work in each subject but it may be subdivided into weekly contracts. Further adjustment to individual differences may be made by differentiating the assignment into three divisions: minimum, average, and maximum requirements. The minimum should be on the level of the slow child; the maximum should challenge the powers of the brightest; the average should stimulate the average pupil to put forth his best efforts. The pupils should be grouped, however, not according to any formal classification but on the basis of the work actually accomplished from day to day.

4) The teacher is present in the room to maintain favorable conditions for study, to explain the details of the assignments, to instruct the pupil in the use of the equipment of the department, and to stimulate and guide his reaction to the assignment. Individual conferences may be held informally with the pupils at any time and group conferences, in which all the pupils working on a certain contract may take part, at stated times. *In each case the pupil pursues the teacher instead of the teacher pursuing the pupil, as is usual under the traditional plan.*

5) There must be a definite system of checking up the progress of the pupils. Written reports may be required and tests may be given to a group completing a definite assignment. Individual work may be inspected by the teacher and criticisms and suggestions offered. The general progress of each pupil may be recorded on a graph kept by the teacher. A similar graph may be kept by each pupil and used to gauge his own progress.

The author is indebted to Miss Sylvia Soupart of the West Virginia University High School for the following brief article on the Dalton Plan and for a description of the plan in operation in the West Virginia University High School.

3. The Dalton Plan

Statement of Principles

Freedom united with responsibility is the underlying principle of the Dalton Plan of education. This plan recognizes the fact that citizens in a democracy will

be happy and useful in so far as they have learned to make the best use of their time and to accept their responsibilities as citizens. The child loves freedom and glories in having responsibilities given to him. Many tragedies would be averted if men were taught how to use the liberty which is the right of every citizen and how to meet the demands made upon them. The sooner such training is undertaken in a child's education, the better will be the chances for success. The Dalton Plan provides a natural way of securing the necessary experiences which will result in a better type of citizenship.

At the outset let me say that the Dalton Plan may be used in any type of school and with any curriculum. It has its place in the one-room rural school as well as in the large city school. While it does not attack the curriculum and may be employed with the traditional curriculum as well as with the most modern one, at no distant date it will be adding its contribution to curriculum making by a process of enrichment and vitalization.

The distinguishing features of the plan are the *Contract*, or assignment; the *Workshop*, or free study period; and the *Conferences*.

The skill with which the assignment, or contract of work, is made out is a big feature in the success of the plan. These contracts are the work of the teacher. A contract is a block of work covering a period of two, three, or four weeks, depending upon the conditions in a particular school. At present the University High School is using the two-weeks contract but it will increase the block of work as soon as the pupils can handle a more sustained assignment. The monthly assignment

has been in operation in Dalton, Massachusetts, since 1919.

Much of the success of the plan depends on the interesting quality and clearness of the assignment. The contract is neither a lengthened lesson plan nor a series of lesson plans, but a unit of teaching. The contract consists of the foreword or introduction, the statements of readings, including the basal text, and suggestions or directions for study.

The foreword must be well written. It should set forth the aim of the particular block of work and recall to the pupil's mind the central truth of the previous assignment. It should provide the necessary background and, not least of all, it must stimulate the interest of the pupil and become a spur and challenge to him. In a word it is the key to the situation. In this work there is a premium on the ingenuity of the teacher, who must have but one idea in mind—that of working with the individual child and helping him to learn all he can.

The statement of the material included in the contract is the next consideration. Clear and exact must this presentation be. The selection and organization of this material are of vital importance.

Under the directions for study the teacher has one of the finest opportunities for real teaching. In addition to the questions and references, the teacher may here suggest projects through which the central truths of the assignment will be developed. Several projects may be suggested, thus enabling the individual pupil to find something that he can do, even though he is a slow pupil, and much that he can do if he is a superior pupil. In this manner provision may be made for individual differences.

This lengthened assignment, covering a period of two, three, or four weeks, enables the pupil to see the block of work as a unit, provides for freedom of attack, and permits him to advance as rapidly as he can. In brief, the individual is kept constantly in mind, his needs, his abilities, and his personality being the determining factors in the work.

While stress is placed upon the work of the individual the social factor is not neglected, for there are many opportunities for discussion and group activities in the conferences. These are of three kinds: the called conferences, the small group conferences, and the individual conferences. The called conferences are required of all the pupils of a given group. They may be called at stated intervals or when the need arises. No specific preparation is required of the pupils, for the purpose of these conferences is to clear up some general difficulty or to carry on a piece of laboratory teaching in composition or a bit of dramatization—in fact, any social activity. The small group conferences are largely voluntary, being held at the request of a group for the purpose of discussing a problem of common interest. Thus pupils are brought together by a common bond.

But it is in the individual conference that some of the most effective work is accomplished. Here pupil and teacher come together to test the work under way. In an intimate talk the merit of the pupil's work is revealed to the teacher and the teacher can suggest many things necessary for the student's welfare and development. These conferences constitute one of the most pleasant and profitable phases of the work.

The workshop is just what the term indicates. In it the pupil studies where he desires and as long as he

pleases. Each teacher's room becomes a workshop for the particular subject that he teaches; the teacher is a master workman, stimulating and guiding his apprentices. Each workshop is provided with the books, materials, and equipment necessary for carrying on the work in one subject. The pupil is free to come and go from room to room at will. He spends a part of a long study period in one room and a part in another or he may spend all the time in one room. This plan conserves his time and energy. He wastes no time in waiting for reference books, for they are readily accessible. He has the assistance of the instructor whenever it is needed. He lives in a study atmosphere. He is not compelled to drop his work at the moment when his interest in it is keenest.

How foreign to the ways of real life are the forty-five minute periods in the average school! We would think it a queer if not an insane procedure if the farmer divided his day as it is done in school. What would one think of a farmer if he should spend forty-five minutes in plowing; drop his plow wherever he happened to be at the end of that time and spend the same length of time in building a fence; then spend an equal amount of time in digging a well in a remote part of the farm? Yet this is the type of procedure that we force upon the pupils in a traditional type of high school organization. The farmer may devote a week or more to making hay. Why not allow the child to remain at a given task until it is completed or until his peak of interest has been reached? Soon the pupil will learn to budget his time to the best advantage and this training will be of tremendous value to him in all life activities.

It is not an easy thing to set down in so many words

the most valuable contributions of the Dalton Plan. The spirit of earnest endeavor and the satisfaction of accomplishment which are the *big features* of the plan must be experienced in order to be understood fully. In attempting to summarize the definite advantages of the Dalton Plan one may make the following suggestions:

1. Individual differences are recognized. Each pupil may go at his own rate.
2. The responsibility is placed where it belongs—on the pupil.
3. The waste of time is reduced to a minimum.
4. The pupil pursues the teacher—not the teacher the pupil.
5. Study methods may be watched and directed.
6. The pupil can have help when he needs it most.
7. He can plan his work, for he sees it as a unit.
8. He learns to budget his time.
9. He really does the work for which he receives credit.
10. It is easy to discriminate between true and false progress.
11. Nervous strain on the teacher is eliminated because this plan demands better preparation on the part of the teacher with the objective clearly in mind.
12. Discipline is no longer a problem, for everyone is busy.

13. The quantity of work as well as the quality is increased.
14. Self-reliance and self-respect are developed.
15. The teacher can know her pupils more quickly and therefore can be of more service to them.

Operation of the Plan in the West Virginia University High School

The Dalton Plan as described in the preceding section is now in operation in the University High School. This school was organized in September, 1925, with an enrollment of sixty pupils doing first and second year high school work. Four full-time teachers are employed: one each in English, mathematics, social science, and physical and biological science. The work of the regular staff is supplemented by seniors in the university who are doing practice teaching under the direction of members of the department of education, the department of public school music, and the director of athletics for girls.

The subjects offered in the ninth grade are English, general science, civics, general mathematics, home economics, agriculture, practical arts, and, in some cases, French. In the tenth grade are taught English, world history, geometry, French, general science, home economics, practical arts, and agriculture.

In addition to these, some work is offered in music and physical education. The course in music includes chorus work, glee club, orchestra, the violin, and the clarinet. Basket ball and baseball are elective for boys and folk dancing for girls.

The daily schedule of activities is as follows:

8:55–9:00. Home room assembly for roll call and announcements
9:00–11:00. Workshop or study period
On Tuesday and Thursday from 10:30 to 11:00, general assembly
11:00–11:30. Group conferences (See schedule.)
11:30–12:00. Group conferences
12:00–12:30. Lunch
12:30–1:00. Boys' glee club on Tuesday and Thursday
Girls' glee club on Monday and Wednesday
Chorus for all on Friday
1:00–2:00. French, home economics, and practical arts, workshop and laboratory work
2:00–2:30. Group conferences
2:30–3:30. Home economics and agriculture
3:00–5:00. Athletics

No pupil leaves school until three o'clock unless he must do so to catch a train. The assembly in the home rooms enables the teacher to keep a record of attendance and to convey any necessary information to the groups.

During the workshop periods a pupil may study in any workshop that he chooses. He often selects the subject in which he needs help, for the teacher is always present in the room to give legitimate assistance to any pupil that may be having difficulty with an assignment. No group conferences are held during these periods in order that the instructor may be free to assist

individual pupils at any time that a need for such help arises. The pupil is free to come and go from room to room. He may spend all the period on one subject or he may divide his time among two or three subjects. The pupil learns to budget his own time to the best advantage. Each workshop contains all the necessary references and other equipment required to enable the pupil to pursue his work without waste of time and energy.

Because of the fact that the pupils of the University High School are rural children and the periods for athletics come from three to five o'clock, the students taking music lessons have them during the workshop periods. This work is regarded as actual school work. There are no extra-curricular activities in this school—all the activities are curricular.

The general assembly is presided over by one of the pupils. The programs for these meetings are planned by a committee of pupils and a teacher. These programs feature the work of individual pupils and departments and are the outcome of the pupils' study.

The hour from eleven to twelve is divided into two periods for group conferences. These are not class or recitation periods but they are devoted to group discussion of difficulties encountered in the study periods. Since these conferences are participated in by pupils who have made a certain amount of progress on a contract, they accomplish much more than recitations for pupils of uneven ability and progress. The schedule is so arranged that every pupil has at least two group conferences weekly in each subject. More conferences may be held if need for them arises.

Ten contracts, or assignments, cover the work of one

school year but an individual pupil may do more or less than a year's work in any of his subjects. If he does less than a year's work he is given credit for whatever he does. If a pupil completes nine contracts in a year he begins with the tenth the following year. Thus he is given credit for the work that he has completed and does not lose a whole year because he is a slow pupil or has been prevented by illness or other causes from completing the full amount of work. No failing mark is recorded, since the pupil continues to work on an assignment until his effort is satisfactory to the teacher. *Passing*, *Fair*, *Good*, and *Excellent* are the descriptive words used to indicate the character and amount of work done, for quantity counts as well as quality. A pupil who does the maximum amount of work and does this work exceedingly well has his progress card marked *Excellent*, whereas one who does the minimum amount in quite an ordinary way may be marked *Passing* or *Fair*. The ability of the pupil is a determining factor in every case, for the aim of the school is to get every pupil to work to the limit of his capacity. Whether the capacity is great or small the teacher is satisfied when he feels that the pupil has worked to this limit.

The Contracts

As was pointed out in a previous discussion, the *contract* is an important feature of the Dalton Plan. Much of the success of the plan depends upon well-prepared contracts. To illustrate just what is meant by a contract and how one may be prepared, a few contracts being used in the University High School will be reproduced. In each case these contracts were pre-

pared by the teacher whose name appears in the heading.

(1) Contract I

Modern European History Time, Three Weeks

Grade 10

Teacher, Miss Lucy Coplin

Foreword. About 350 years ago two questions came before the people of England: (1) Which shall rule, the people by means of Parliament or the nobility through the king? and (2) Is England to be Protestant or Catholic?

Readings

Hazen: *Modern Europe*
McNeal: *Modern Beginnings in Europe*
Robinson, Smith, and Breasted: *Our World Today and Yesterday*

How is the way in which England answered these questions affecting America today?

Section I. The Establishment of Parliamentary Government in England

1. What is the historical significance of the House of Tudor? Of the House of Stuart? Account for the fact that the reign of James I is a turning point in history.

2. Describe the personal characteristics of James I, Charles I, James II, and Charles II. Explain how the personalities of these rulers made history.

3. From your reading of newspapers and magazines select an outstanding present-day American who is making history on account of his or her personality.

4. The English people wanted a government by Parliament and not by a monarch. Read in McNeal how this desire was finally realized. The following topics will help you, as they are "stations of interest":

1) Traditions of the English opposed autocracy
2) Puritan opposition to monarchy
3) Belief (of some) in "divine right"
4) Dispute over the control of public revenues
5) Petition of Right
6) Cromwell's dealing with Parliament
7) The Restoration
8) The Revolution of 1688
9) The Bill of Rights

5. How did cabinet government arise?

Section II. The Adjustment of Religious Differences

1. Read *Our World Today and Yesterday* for an understanding of how England fell away from the papacy. Let the following topics guide you:

1) The Pope's objection to the divorce of Henry VIII and Catherine of Aragon (Note how Henry and his Parliament agreed.)
2) Act of Supremacy
3) Dissolution of English monasteries
4) Death of Henry leaves the issue—Catholicism versus Protestantism—to be settled by his children, Edward VI, Mary, and Elizabeth
   a) Protestant practices introduced by Edward VI

b) Mary and the Catholic Restoration
c) England again Protestant under Elizabeth. Establishment of the Church of England

Section III

In order that you may understand the man who was "king in all but name and more than king in power" and yet who "built only on shifting sand," read the biography of Cromwell. As you read try to analyze the secret of his strength and account for his weakness. (Use Hazen's *Modern Europe.*)

1. How did the Seven Years' War contribute to the growth of the British Empire?
2. Account for the fact that many Englishmen rejoiced in the success of the American Revolution.
3. Trace the early history of Russia. The rule of Peter the Great marks a tremendous epoch in the history of Russia.

1) Describe the boyhood of Peter. What were his personal characteristics? How did travel affect him?
2) Explain his policies for Russia.
3) Why and how did Peter found St. Petersburg?

(2) Contract I

English Grade 9 Time, Three Weeks

Teacher, Miss Sylvia Soupart

Foreword. All the year you have been trying to improve your speech and your writing. You have discovered many errors and you have corrected some

of them. Not only have the teachers helped you directly and indirectly but there is a noticeable effort on your part to help one another. As long as you live you should be a student of English; you will find that there is always room for improvement. I need not tell you how necessary it is that you make your speech and writing as correct and effective as possible. Recently a young woman appeared at a metropolitan theater as a dancer. She astonished those who came in contact with her because she spoke so correctly and so beautifully. In explanation she said that in order to succeed in her work she had to speak and write well as managers nowadays are loath to employ persons who speak ungrammatically, use slang, and lack refinement in speech. Remember that it is much easier to learn to use your mother tongue while you are young than later on. So in this contract Section I will be devoted to giving special help to each of you where you need it most.

Section I. (One week)

Before Christmas you were given two tests—the Stanford Achievement Test and the Cross English Test. By means of these tests I have been able to learn where your troubles in English are. Since some of you have many, many troubles and some of you but few, I have an individual section for each of you. When you are ready for Contract I ask me for your list of errors. I wish to talk over this section with you before you start work on it, so that you may profit as much as possible by your work.

Let us make a *Good English* campaign our hobby. Let us forget for a moment our difficulties and let us be Good English detectives. If your trouble is in using

wrong verb forms—e. g., saying *have went* instead of *have gone*—put that Good English detective on your trail and have him shadow you, watching for every chance to turn you over to Good English authorities. They will try you and, if they find you guilty, will sentence you for murdering mother English. Surely, those people who have no command, or very little command, of their mother tongue are prisoners as truly as the man behind the bars.

There is no need to envy the good speaker or writer when effort and watchfulness are the only requirements on your part for learning to speak or write well. Money cannot buy pure and effective speech nor is it a gift; it can be acquired by all who care enough to achieve it and are willing to keep watch, and work.

Section II. Short Stories

Read one volume or about ten stories. In a previous contract you read and studied poems and essays dealing with the subject of birds. Now let us become acquainted with a few of the best short stories that have been written. There are all sorts of stories written for all sorts of purposes and they are read by all sorts of people. After you have read stories by some of the best writers you can decide what type of story you find most enjoyable and profitable and you should then read that type widely. In our group conferences I will help you discover some of the writers that you ought to know and that everyone who reads much does know.

Do not read more stories than you can digest. Be sure a story is really yours before you leave it. Remember that I am here to help you master your difficulties. Frequently a reader does not like a story because he

does not understand it. The following items should be carefully considered and mastered in order that our conferences may be profitable:

1. The story itself—the plot.
2. The message—central theme, or main idea.
3. The setting—when, where, and under what circumstances the story takes place.
4. The characters—the number, the kind, and the importance of the characters. Are they life-like? Unusual?
5. The purpose of the story—is it to instruct, inform, or amuse?
6. The author—will it help your appreciation to know something about the author?
7. A comparison of the story with other stories you have read.

Note. In order to help you remember them I suggest that you write out the above points for each story you read.

Section III. (One week)

When you are ready for this section see me in order that we may select a volume of stories that will be of special interest to you. Let us have a conference before you begin this part of the contract. Have in mind some writer, some type of story, some type of character or locality that you would like to know more about so that you will gain more from your reading. Follow the same outline for these stories that you used in Section II.

A minimum of five stories will be required. Anyone reading eight or more stories with understanding will be given additional credit for this extra work. The following selections are among the short stories in the

University Library. (Here fifty selections are listed.)

Note. Let me tell you what these volumes are about if you need this help. Explore a little. If you give a book a fair chance and do not like it return it to the library and select another one.

Group Conferences

The schedule of group conferences is placed on a large blackboard in the main hall where it is easily observed by all the pupils. Each instructor schedules his own conferences, noting what groups are already scheduled in order to avoid conflicts. In general, it is the aim and policy of the teachers to call at least two group conferences weekly in each subject. It will be noted that during the week of April the nineteenth most of the pupils were working on Contract I. A few were still below I, and some were already working on Contract J. By the middle of the following week, the H Contracts would all be completed, the number working on J Contracts would be noticeably increased, and there would be a corresponding decrease in the number working on I Contracts.

These conferences are teaching periods in the best sense. Consequently, the value of having all the pupils who have reached the same stage in their work participate will be readily appreciated.

When any group becomes too large to be handled effectively it may be divided, as is done in the schedule for April the nineteenth, placing the boys in one group and the girls in another. Such a division results in greater homogeneity of groups, and the work can be planned to meet the needs of a particular group. A sample schedule follows:

SCHEDULE OF GROUP CONFERENCES

	Monday	Tuesday	Wednesday	Thursday	Friday
April	19	20	21	22	23
	History Entire	Social S. Below I	History Entire	General Science Below I	Gen. Math. All on J
11:00	Eng. 9th Girls on I and J	Eng. 9th Boys on I and J	Eng. 9th Girls on I and J	Gen. Math. All on J Eng. 9th All on I	Gen. Sci. Boys on I Eng. 9th Girls on I
11:30	Social S. On and above I	Gen. Sci. All on I	Social S. Entire	Gen. Sci. All on I	Social S. Girls on I
	Eng. 10th Entire	Gen. Math. All below I	Eng. 10th Entire	Eng. 9th All on J	Eng. 10th Entire
	Eng. 9th All below I	Gen. Math. All on I	Eng. 9th All below I	Agricul. Entire	Plane Geom. Entire
2:00	Agricul. All on I	Eng. 9th Entire	Plane Geom. Entire	History Entire	Social S. Boys on I and J
			Agricul. Field trip		Eng. 9th Girls on I and J

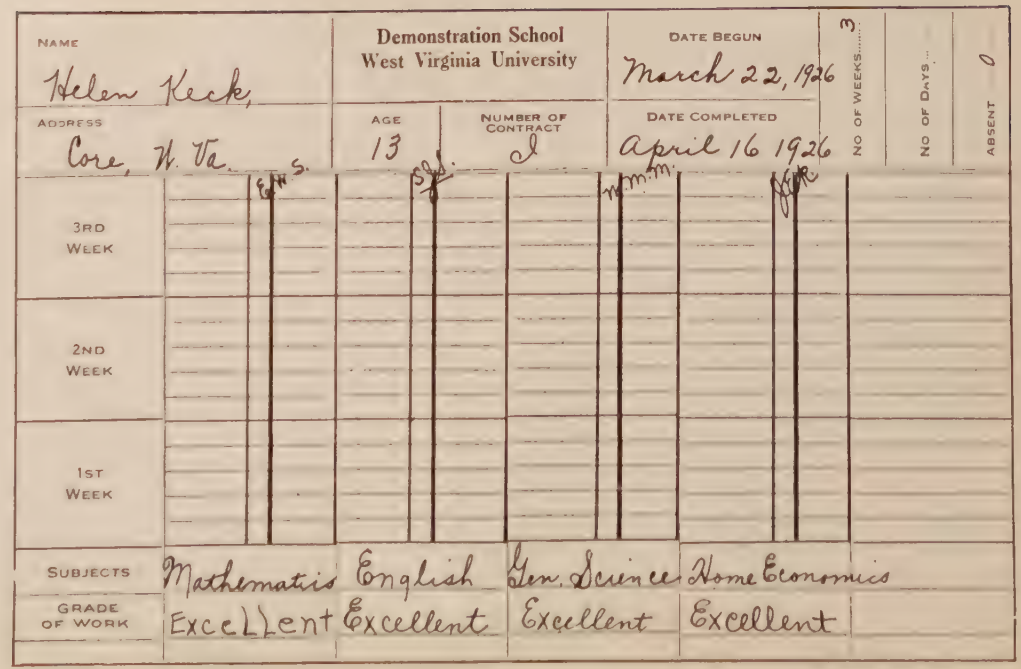
Checking Up the Progress of the Pupils

The progress of each pupil is checked up carefully through individual conferences, written reports, tests, and progress cards. Individual and group conferences are held while the work on a contract is in progress. When a pupil completes a contract the teacher checks his work by one or more of the foregoing means and the quality of the pupil's work by marking it *Passing*, *Fair*, *Good*, or *Excellent*. One means of keeping track of the pupil's progress is the progress card, kept by each pupil and verified by the teacher when a contract is completed. A sample of this card is on page 106.

As the pupil does his work he indicates his progress with pen or pencil, beginning at the bottom of the card and drawing the lines upward. Each horizontal line represents a day's work and each block of five a week's work. When the pupil has completed all his contracts and the teachers have approved his work, he presents the completed card to his home-room teacher, who issues a new progress card. This new card entitles the pupil to receive the next group of contracts from the teachers under whom he is working. A pupil cannot get Contract J in English, for example, until he presents the Contract I progress card. When the teacher checks up the pupil's work on any contract, he draws a parallel line, usually in red,* affixes his initials, and marks the grade that indicates the quality of the work.

From these progress cards the home-room teacher secures the data for the permanent records of her group. The progress card is also a report card to the parents.

*On the card shown on page 106, the lighter parallel line represents the teacher's line—the red line.



NAME: Helen Keck,

Demonstration School
West Virginia University

DATE BEGUN: March 22, 1926

NO OF WEEKS: 3

ADDRESS: Core, W. Va.

AGE: 13

NUMBER OF CONTRACT: 1

DATE COMPLETED: April 16 1926

NO OF DAYS:

ABSENT: 0

3RD WEEK				
2ND WEEK				
1ST WEEK				
SUBJECTS	Mathematics	English	Gen. Science	Home Economics
GRADE OF WORK	Excellent	Excellent	Excellent	Excellent

By examination of it the parents can see at any time how far the child has progressed with his work and what quality of work he is doing. Moreover, by a glance at the progress card any teacher can see how a pupil stands in any subject.

In addition to the progress card each home-room teacher keeps a room graph showing the progress of each pupil in his group on each contract. This graph is similar to the progress card, except that it shows the progress of the whole group.

This chart may be made any convenient size but it should have spaces enough for the entire enrollment of a given group. It is arranged for contracts covering three weeks.

The chart is posted in a prominent place in the workshop, where it is allowed to remain until all the pupils have completed their work on the contract. It will be observed that the room graph is a verification of the pupil's progress card.

The portion of the room graph reproduced on page 108 will illustrate the use of the chart, which is simply to show the teacher and pupils where each pupil stands at any given time. A black line is drawn by the pupil and a red line by the teacher.* This chart enables the teacher to see at a glance what pupils have reached any given point in the work and to determine when group conferences should be called. For example, the instructor may call a conference of all the pupils in ninth-grade English who have completed ten days' work. The red line indicates that the teacher has held a conference with the pupil and has found the work satisfactory.

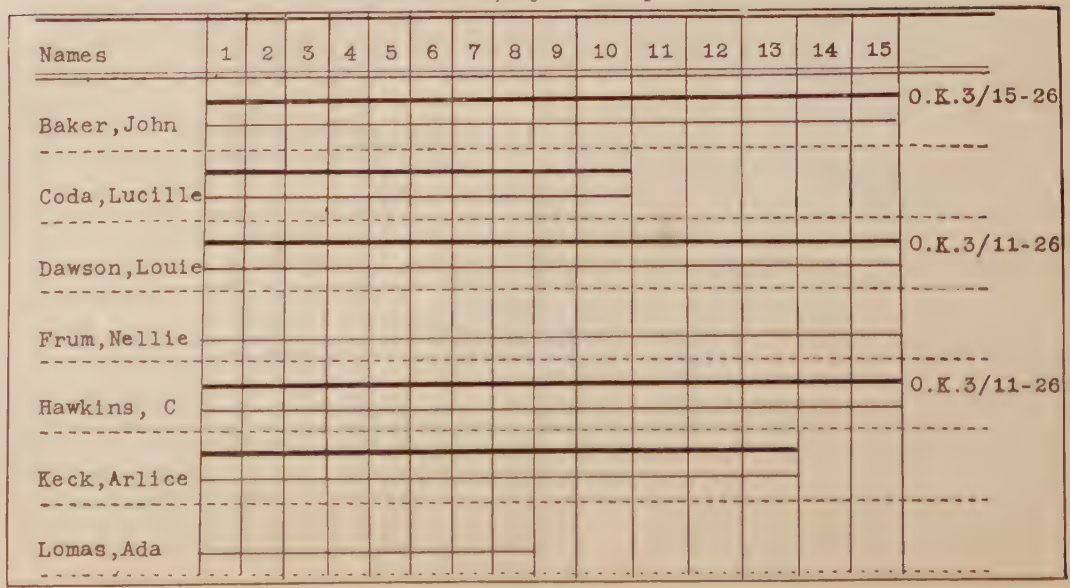
*On the card shown on page 108, the lighter parallel line represents the teacher's line—the red line.

Instructor's Room Graph

Contract H

English Grade 9 Time, Three Weeks

Instructor, Sylvia Soupart



In continuing the interpretation one will see that three students have completed Contract H; one student has done all but two days' work and has conferred with the teacher; one student has completed the entire contract but has not had a conference with the teacher; another has done ten days' work and has had a conference with the teacher; while another has done only eight days' work and has had no conference. When the teacher approves the pupil's work on the entire contract he indicates his approval with the letters *O. K.* and the date of completion.

The foregoing account of the Dalton Plan in the West Virginia University High School shows how this plan can be operated in a small high school. Probably the average high school has better conditions under which to operate the plan than this high school has; nevertheless, the plan is working out satisfactorily and is demonstrating the superiority of this new type of organization over the traditional type.

Either the lengthened-period or Dalton plan is superior to the old system with its short periods devoted entirely to hearing recitations and with its frequent change of classes. Doubtless, the Dalton Laboratory Plan, or some similar plan, is superior to any of the other plans described but most of us are too much in bondage to the past to undertake such a radical reorganization of our schools. Nevertheless, the writer recommends this plan to all school men enterprising and progressive enough to be will-

ing to depart radically from traditional high school organization and administration. For those who desire merely a modification of the old plan in the direction of progress some form of the lengthened-period plan is desirable. The particular plan should be determined by local conditions. The four-period plan with extra credit for superior work has the advantage of eliminating the need for a general study hall with its attendant evils. The pupil spends all his time under the immediate direction of the regular classroom teachers. On the other hand this plan would be difficult to put in operation in small high schools with a meager equipment and a scant supply of teachers. In these schools shorter and more frequent periods may be desirable. As a general rule, the periods should be as long as can be conveniently arranged and the pupil should spend most of his study time under the supervision of the regular classroom teachers, not in a general study hall.

III. Summary

The chapter may be briefly summarized as follows:

1. Supervised study has failed to produce measurable results because (1) there has been an almost hopeless confusion as to the meaning of the term, (2) the learning processes have not been analyzed and a definite technique developed for directing each type of study, (3) teachers have not been trained adequately for conducting super-

vised study, and (4) in many cases supervised study has been subordinated to the formal recitation.

2. The teacher must have a proper conception of supervised study and a thorough knowledge of the principles of learning. She must be able to analyze the subjects she teaches into the chief types of learning involved and she must have a definite plan for directing the study of each subject.

3. The class period should be divided into (1) the assignment, (2) the pupils' reaction, and (3) the checking up on the progress of the pupils, but no time limits should be assigned to these divisions.

4. In the elementary school the organization may take the form of the three-group plan, the differentiated assignments, or the Dalton Plan. In the one-teacher rural school the differentiated assignment is, probably, the most practical plan.

5. The high school may be organized on the basis of the lengthened-period plan or the Dalton Plan.

6. The Dalton Plan is in successful operation in the West Virginia University High School. Doubtless, this plan is superior to any other plan described in the preceding pages, particularly for those who are willing to make a radical departure from the traditional high school organization.

CLASS EXERCISES

1. What is the proper relation of the recitation to supervised study?

2. What are the main functions of the recitation in the supervised-study plan of teaching?

3. Outline a plan for organizing supervised study in a class of forty-five pupils in the elementary school. Make a daily program for this class.

4. Outline a plan for organizing supervised study in a rural one-teacher school. Include a daily program.

5. Outline a plan for organizing supervised study in a small high school; in a large high school.

6. Evaluate the plans suggested in this chapter for the administration of supervised study in the high school.

7. Which is the better plan for a small high school? For the large high school?

8. Suggest other plans for conducting supervised study in the elementary school and in the high school.

9. Select the plan that you consider the best. Cite the data to justify your selection.

REFERENCES FOR CLASS USE

1. Breuckner, L. J. "A Survey of the Use Made of the Supervised Study Period." *School Review*. XXXIII: 333-345. 1925.

(A report of an investigation of the practice in the West High School of Minneapolis. Shows a wide variation in the practice of the different teachers.)

2. Brown, W. W. "Making Profitable Use of the Lengthened Period." *School Review*. XXXII: 694-706. 1924.

(A valuable discussion of the proper use of the lengthened period. Opposes arbitrary divisions of the class period.)

3. Burton, W. H. *Supervision and the Improvement*

of Teaching. Chap. IX. New York: D. Appleton and Company. 1923.

(Discusses the meaning and directing of study.)

4. Dewey, Evelyn. *Dalton Laboratory Plan.* New York: E. P. Dutton and Company. 1922.

(A good presentation of the Dalton Plan, giving sample contracts, record graphs, and letters from pupils and teachers in three schools in which the plan is in operation.)

5. Douglass, Lucille. "Teaching English on the Dalton Plan." *English Journal.* XIII: 335-340. 1924.

(A good exposition of the Dalton Plan, but very little on the teaching of English.)

6. Hall-Quest, A. L. *Supervised Study.* Chaps. V and VI. New York: The Macmillan Company. 1916.

(Chapter V describes general plan for the administration of supervised study.)

(Chapter VI gives suggestions for directing study.)

7. Hall-Quest, A. L. "How to Introduce Supervised Study." *School Review.* XXVI: 337-340. 1918.

(Gives some specific suggestions, and a bibliography of the best-known reference books at the time the article was written.)

8. Hillis, C. C., and Shannon, J. R. "Directed Study." *School Review.* XXXIV: 668-678. 1926.

(Gives several good devices for directing study.)

9. JACKMAN, E. D. "The Dalton Plan." *School Review*. XXVIII: 688-696. 1920.

(Describes the Dalton Plan in operation in the high school of Dalton, Mass.)

10. JOHNSON, F. W. "The Dalton Plan." *Teachers College Record*. XXVI: 464-472. 1925.

(Explains the method and purpose of the plan and why it has not been more popular in this country.)

11. JUDD, C. H. *Psychology of High School Subjects*. Chap. XVIII. Boston: Ginn and Company. 1915.

(Discusses teaching pupils how to study. A good analysis of methods of studying.)

12. MARTIN, A. S. "The Long School Day and Directed Study." *Education*. XXXIX: 158-164. 1918.

(Presents the advantages of the longer school day, and the results of a two-years' trial of the plan.)

13. MILLER, H. L. *Directing Study*. Chaps. I and II. New York: Charles Scribner's Sons. 1922.

(Chapter I suggests several illustrative procedures.)

(Chapter II is a stimulating discussion of the administration of supervised study.)

14. MILLER, H. L., AND HARGRAVES, R. T. *The Self-Directed School*. Chap. I. New York: Charles Scribner's Sons. 1925.

(A strong plea for a new procedure in education.)

15. PANKHURST, HELEN. *Education on the Dalton*

Plan. New York: E. P. Dutton and Company. 1922.

(A comprehensive treatment of principles and technique of the plan by its originator.)

16. Parker, S. C. *Methods of Teaching in High Schools.* Chap. XVI. Boston: Ginn and Company. 1920.

(Gives several good suggestions on the supervision of study.)

17. Prouty, Clarissa. "An Experiment in the Use of the Dalton Plan." *The Elementary School Journal.* XXIV: 599-607; 679-691. 1924.

(Describes the main features of the Dalton Plan, and reports an uncontrolled experiment in the application of the plan to grades 7 and 8.)

18. Reavis, W. C. "The Administration of Supervised Study." *School Review.* XXXII: 413-419. 1924.

(A brief but unusually good discussion. Offers many valuable suggestions. Clear and definite.)

19. Sexton, J. W. *Training Teachers to Supervise.* N. E. A. Reports. LVII: 602-606. 1919.

(Suggests how teachers in service may be trained to supervise study.)

20. Simpson, Mabel E. *The Divided-Period Plan of Supervised Study.* N. E. A. Reports. LVII: 587-594. 1919.

(Outlines a demonstration lesson in American History, giving an explanation of each main feature.)

21. Underhill, R. I. "The Scarsdale Application

of the Dalton Plan of Individual Instruction." *School Review.* XXX: 48-56. 1925.

(Describes the way in which the Dalton Plan was introduced into the Scarsdale High School, New York. Contains good suggestions for other schools.)

22. Wilson, Lucy L. W. et al. *Educating for Responsibility.* New York: The Macmillan Company. 1926.

(A good statement of the principles and technique of the Dalton Plan. Shows how the plan works in the various high school subjects. Contains a bibliography.)

23. Young, Eula, and Simpson, M. R. "A Technique for the Lengthened Period." *School Review.* XXX: 199-204. 1922.

(Divides the lengthened period into five arbitrary divisions and suggests the nature and function of each division.)

CHAPTER IV

TYPES OF CLASSROOM ACTIVITIES

Questions to Be Kept in Mind When Reading

1. Can the treatment of supervised study be simplified by the application of the type idea?
2. What are the main types of classroom activity?

I. Type Method of Treating Supervised Study

The problem of supervised study is being attacked from two angles which we may designate as the general and the specific. From the first viewpoint writers have attempted to devise a scheme for supervising study that could be applied to all classroom exercises. Two notable books of this class are McMurry's *How to Study and Teaching How to Study* and Earhart's *Teaching Children How to Study*. These were pioneer books in their field and they have rendered an invaluable service but their application is restricted very largely to one type of classroom exercise; namely, the assimilation of material from the printed page. Another book written from the same viewpoint, though very different in its manner of treatment, is Whipple's *How to Study Effectively*. This book presents thirty-eight rules for study, with brief expositions,

designed to increase the effectiveness of study. These rules have a wide range in their application, covering nearly all phases of learning but the treatment of each rule is too brief to be very helpful to teachers and pupils uninstructed in the varied and complex processes of effective study. For those already familiar with the field it provides a convenient and helpful summary.

From the specific viewpoint some hold that there must be a treatise on each school subject discussing the principles and devices of effective study, just as there is a series of special method books on the teaching of the various school subjects. Three books of this character have appeared in recent years:

Simpson's *Supervised Study in History*
McGregor's *Supervised Study in English*
Sumner's *Supervised Study in Mathematics and Science*

These books explain and illustrate abundantly how to supervise study in history, English, mathematics, and science. To the special teachers of these subjects they should prove extremely valuable, especially to high school teachers. The idea of having a book on each subject, however, would seem to be impracticable at our present stage of development, particularly for elementary teachers, for if each subject must receive separate treat-

ment more time would be required to train teachers for the supervision of study than teacher-training institutions have at their disposal.

Some writers have attempted to combine the two points of view in one treatise. A few books of this type are now available. They state the general principles of supervised study and then attempt to apply these principles to all, or nearly all, the elementary subjects. But these books have most of the defects of the general plan with but few of the merits of the special treatise. There is too much abbreviation and condensation in them. Naturally, a brief chapter on how to supervise study in any subject must deal too largely in generalities to be very enlightening to teachers not already familiar with this difficult field.

Still another group of books has appeared dealing with the general problems of how to study effectively, how to direct study, and how to use one's mind but these do not cover thoroughly the field of supervised study.

The general-method treatment of supervised study, because it is restricted in its application, is therefore inadequate and lacking in effectiveness, while the specific treatment of each subject makes too heavy demands upon our time. How then can supervised study be treated effectively? Is there any way of escape from this dilemma? Fortunately there is a way out. The writer believes

that an economical and effective treatment may be based upon the types of classroom activities. This plan simplifies and clarifies the whole problem of directing the pupil's learning activities. The type idea has been applied by Dr. Charles A. McMurry and others to teaching and to the organization of the curriculum, but no one has made any extensive use of the idea in dealing with the problems of supervised study. Even the latest books in this field make but little use of the type idea. Nevertheless, the type plan of treatment is just as applicable to supervised study as it is to teaching, for supervised study is only a superior kind of teaching. Moreover, the authors who have written on supervised study in one subject only have found it most convenient to center the discussions around the usual lesson types. Simpson and Sumner particularly follow this plan. Thus it appears that a subject can be treated most conveniently by the type plan, indicating that the type of activity and not the subject is the strategic base of operations in attacking the problems of supervised study. Consequently, the material of this text is organized on the basis of typical classroom activities.

Furthermore, it will be noted that some of the familiar terms applied to lesson types are dropped and other terms substituted. For example, the terms *induction* and *deduction* do not appear. These are logical terms and have never been under-

stood by the rank and file of teachers. *Problem solving* covers the field of both induction and deduction and has the advantage of easy recognition. The average teacher recognizes a problem-solving lesson when one is observed but he is seldom able to tell whether the class is thinking inductively or deductively.

The term *socialized recitation* is also omitted. This term refers to the class organization and to the method of conducting a recitation rather than to the type of work. The class period for any type of activity may be socialized. When supervised study is properly administered many of the recitations will be socialized recitations. The study lesson is not a type; it is a method of directing a pupil's study. It may occur as an integral part of any of the types described in the following pages.

II. Types of Learning

The writer subscribes to the idea that all learning involves the same fundamental processes, that all learning is connection forming. As some have said, learning of whatever sort is a process of establishing preferential routes in the nervous system. That is to say, all learning is a process of forming connections between stimuli and appropriate reactions. The formula is: *stimulus–bond–response.* Nevertheless, most, if not all, schoolroom activities may be grouped around a few types. If one will

take the time to observe all the work of a school for one day he will find the pupils engaging in manifold activities. They will be learning to spell; reading a selection from the school reader; performing the fundamental operations in arithmetic; solving problems in arithmetic and other subjects; studying the geography of the United States or some foreign country; relating a story or a biography; reading an English classic; singing; writing; and engaging in many other activities. The direction of all these activities would seem to be an almost hopeless task if each task were unlike any other. Fortunately, these activities are not so manifold as they appear to the superficial observer, for many of them are very similar in that they involve essentially the same mental processes. The problem of direction may be simplified to a surprising degree by noting that most of the activities of the classroom conform to a few fundamental types. To point out and illustrate these types is the specific aim of this chapter.

1. Simple Associative Learning

The type of classroom exercise designated "simple associative learning," following Thorndike, is commonly known as drill, habit formation, or habituation. It comprises the simpler cases of the *stimulus-bond-response* series; hence the term, "simple."

Most of the experimental studies of the learning processes have been in this field: Bryan and Harter's study of improvement in telegraphy, Starch's substitution experiment, Book's study of the improvement of typewriting, Swift's study of progress in ball tossing, and Batson's "The Acquisition of Skill." A brief review of two of these studies will aid in making clear the nature of this type of learning.

Starch's substitution experiment.[1] The aim of this experiment was to determine the necessary length and distribution of practice periods in forming simple associations. The material consisted of six blanks, each containing a keyboard of letters and numbers at the top, with connected prose on the left-hand margin.

Forty-two students took part in the experiment. They were divided into four groups. The first group worked 10 minutes twice a day for six days; the second group, 20 minutes once a day for six days; the third group, 40 minutes every other day for six days; and the fourth group did the entire task at one sitting. In each case the total time was 120 minutes.

Starch found that the 10-minute group reached an average speed of about 53 letters a minute; the 20-minute group, about 51 letters a minute; the

[1]Starch, Daniel. *Journal of Educational Psychology.* III: 209-213. Warwick and York, Inc., Baltimore, Md.

40-minute group, about 39 letters a minute; and the 120-minute group, about 26 letters a minute.

For our present purpose the important point is to note that the learning in this experiment consists largely in mastering the keyboard. In order to make satisfactory progress the learner must establish a connection between each letter and its number according to the keyboard: for example, A must be connected with 25, N with 13, and D with 17. Thus "and" would be written "25-13-17." In this case learning, therefore, consists primarily in establishing a bond between each letter of the alphabet and its key number, so that the learner can write without referring to the keyboard.

Swift's ball-tossing experiment.[1] For the purpose of studying improvement in the acquisition of skill Swift had six subjects practice ball tossing, continuing for several days. Five of these subjects practiced with two balls, using both hands. The daily practice consisted of ten trials for each of the subjects. The number of tosses that a subject could make without dropping either of the balls constituted a trial. The score for each practice period was the total number of catches made in ten trials.

Swift's curves, showing the progress of his subjects, all have the same general form, being concave to the y-axis; all show marked daily and short-time fluctuations but no long plateaus.

[1] Swift, E. J. *The Mind in the Making*. pp. 167-190. Charles Scribner's Sons, New York. 1908.

The point of prime importance, however, is to observe the nature of the learning processes involved in gaining skill in ball tossing. The chief problem is the acquisition of new motor adjustments. The learner can readily focus his attention on the movement he desires to make but skill in the performance of these movements can be acquired only slowly and through much practice. For example, it required about fifteen days for one of the subjects to make a score of a hundred in ten trials, and about forty days to reach the thousand mark. Acquiring new motor adjustments is a case of simple associative learning.

It will be observed that learning to juggle the balls is more difficult than learning to make the substitutions. Acquiring skill in ball tossing requires that new motor adjustments be made or that movements be perfected that were only partly under control, whereas making the substitutions requires only the combination of acts already under control.

While the foregoing experiments eventuate in the strengthening of bonds that have but little utility, nevertheless they are useful as illustrations of the simple associative type of learning. More practical illustrations may be provided by examining a few of the school subjects.

1. **Arithmetic.** The mastery of arithmetic involves a large amount of simple associative learn-

ing. First, there are the 45 addition number combinations, which are in part as follows:

1	2	3	4	5	6	7	8	9
2	2	2	2	2	2	2	2	2
3	4	5	6	7	8	9	10	11

To learn these number combinations the pupil must establish simple connections, or bonds, between the stimuli and the appropriate responses. For example, to learn that 5 and 2 are 7, he must establish a connection between 5 plus 2 as the stimulus and 7 as the response. Similarly, he must learn all the other addition combinations. The same type of learning is required in mastering the subtraction, multiplication, and division tables and in gaining control of the fundamental operations. In addition to the habits required in performing the four fundamental operations with integers still another set of habits must be acquired for similar operations with fractions, both common and decimal. Furthermore, each of the fundamental operations may be subdivided into a number of specific habits, such as single-column addition; carrying; "bridging the tens"; subtraction without borrowing; subtraction with borrowing; multiplication with carrying; simple division; division with carrying. Each of these operations, being relatively distinct, requires the formation of a specific

habit. Likewise, the learning of the table of weights and measures requires the association of a set of symbols with their meanings. Thus it will be seen that much of the work in arithmetic involves learning of the simple associative type.

2. **Spelling.** Learning to spell conforms almost entirely to the simple associative type of learning. Preliminary to learning to write the letters of a word one learns its meaning and pronunciation. Finally, a connection is formed between the meaning of the word and its written symbol, so that the word can be spelled correctly in written composition. Thus learning to spell requires the formation of a number of simple connections between definite stimuli and the appropriate responses. A brief description of an actual spelling lesson will serve as a concrete illustration.

This lesson was taught in the sixth grade and consisted of nine words, three of which were new. The remaining six words had proved difficult in earlier lessons. The complete list was as follows:

New words: office, omit, order
Review words: architecture, comfortable, foreigner, immediately, occasion, peninsula

The new words were written on the blackboard and an attempt was made to form the right connections by (1) teaching the pronunciation, which in this case was learned by imitation, (2) teaching

the meaning by explanation and by having the pupils use the words in sentences, (3) calling attention to the difficult parts of the words, as the two *f*'s in *office*, and (4) having the pupils spell the words orally and write them in their spelling blanks. Then the review words were written on the blackboard and attention was called to the difficult parts. Following this exercise the teacher erased the words one by one, calling upon some pupil to spell each word immediately after it had been erased. Finally, these words were written by the pupils in the appropriate places in their spelling blanks.

Thus learning to spell may be analyzed into four specific processes, each of which results in the formation or strengthening of a connection between a stimulus and the appropriate response:

Stimulus	Bond	Response
Written symbol of word		Pronunciation
Written or spoken symbol		One or more meanings
Spoken symbol		Naming or writing the letters in order
Meaning of the word		Writing the words in compositions

3. Reading. Although reading is primarily a process of thinking, learning to read, or mastering the mechanics of reading, involves a large element

of simple associative learning. Learning to read may be analyzed into four processes:

1) Word recognition, or learning to recognize the printed symbols
2) Acquiring a new set of eye movements
3) Phonetics, or analyzing words into their simpler elements
4) Associating symbols and meanings, or thought getting

Obviously all these processes, except the fourth, belong to the simple associative type of learning. Moreover, modern methods of teaching beginners to read advocate extended drill on word recognition and, phonetic analysis. For example, the authors of the *Progressive Road to Reading* series of school readers advocate drill on word recognition by position and by comparison. For this work the blackboard, or charts, may be utilized. The material is arranged systematically as follows:[1]

I. The *hen found* a *bag* of flour.
II. The *hen found* a *bag* of flour.

hen	found	bag
hen	bag	found
bag	hen	bag
found	found	hen

First, the pupils read the sentences from the blackboard or chart; then they learn to recognize

[1] From "The Progressive Road to Reading." Plan of Work by Burchill, Ettinger, and Shimer. Published by Silver, Burdett and Company.

the underscored words by position and by comparison. Finally, the words are arranged at random as indicated in the following chart:

bag	found	bag	found
found	hen	found	bag
hen	bag	hen	hen
found	hen	bag	found

With this new arrangement the pupils are drilled on independent word recognition. All the difficult words of the story are subjected to a similar treatment.

Upon the completion of the first story phonetics is introduced with elaborate devices for drill on pronouncing phonograms and on vowel and consonant sounds.

Similarly, other authors of methods of teaching reading advocate more or less elaborate systems of drill on word recognition and in phonetic analysis, all of which is purely simple associative learning. Evidently this type of learning occupies a large place in learning to read. Word recognition and word analysis require the formation of simple connections between stimuli and appropriate responses.

4. **Handwriting.** There are two chief problems in learning to write: (1) acquiring correct form and (2) learning to execute the writing movements—motor control. Form refers to such matters as correct posture, manner of holding the pen,

position of the hand and arms, and the position of the paper. Correct form may be attained through imitation and practice. The writing movement, however, is very complex, comprising the movement of the hand across the page from left to right, the backward and forward movement of the arm on the muscle pad in forming the large letters, and the finger movements in forming the small letters. Moreover, all these movements must be coördinated to attain skill in writing. Progress is made slowly and laboriously by perfecting the necessary motor adjustments. The most difficult problem is acquiring motor control; form is comparatively easy to attain. Thus handwriting is a good illustration of the simple associative type of learning involving new motor adjustments.

Perhaps the foregoing illustrations from experimental studies and from school subjects are sufficient to make clear the meaning that is attached to simple associative learning throughout the remainder of this book. In addition, the illustrations from school subjects should aid the teacher in classifying her lessons under the appropriate types. Stenography and typewriting are other subjects belonging for the most part to simple associative learning. It should be noted that this type of learning constitutes a part of the learning in all school subjects. Every subject has certain fundamental elements which should be isolated and drilled upon

until they are made to function on the plane of habit. For example, language forms, dates in history, and formulas in chemistry and other sciences are cases of simple associative learning.

2. Assimilative Thinking

Assimilative thinking is used in this connection to name that type of classroom activity which consists of thoughtful, or reflective, reading. Assimilative thinking is a peculiarly appropriate term for this type of exercise because it directs attention to the essential factor in effective reading: namely the assimilation of ideas, or thought getting. When the teacher assigns for study a chapter in a textbook the proper response on the part of the pupil is assimilative thinking. His task is to assimilate the ideas of the chapter, that is, to understand them, to relate them to his stock of usable ideas. This type of activity is familiar to all teachers, occurring frequently in all schoolrooms and in many schoolrooms more frequently than any other type of exercise. In fact, the American schools have been aptly called reading schools. In the ordinary schoolroom, reading and reproducing the text is the method usually employed in such subjects as history, civics, geography, and hygiene. Consequently, no extended discussion will be needed to set forth the meaning of assimilative thinking. All that is necessary is to connect the term with a certain type of

familiar schoolroom experience. One concrete illustration, however, may serve to make more definite the essential content of this type of exercise.

Let us suppose that the material for study is chapter XLII of Bourne and Benton's *History of the United States*, the title of which is "The New South." What reactions should the pupils make to this material? First, they should be led to formulate a specific aim for their reading. For example: In what sense is the South of this period a new South? Or, What changes had taken place which made the South a new South? Then the pupils should read to find answers to these questions, to satisfy the demands of the aim. They may be directed to make a list of the progressive movements in the South. This will lead to the selection and organization of the main points in the material. An outline similar to the one that follows may be made by the pupils.

The New South

I. Cotton growing became profitable through the breaking up of the old plantations and the development of small farms operated by white men.

II. Farmers learned how to renew the soil:

1. By the use of fertilizers.
2. By the rotation of crops.

III. Rice farming became profitable through the process of irrigation.

IV. The South learned how to utilize its mineral wealth, especially iron ore, coal, and limestone.

V. Manufacturing developed on a large scale and the following industries became profitable:

1. Making cotton cloth and cottonseed oil and meal.
2. Cultivating peanuts.
3. Lumbering and the making of furniture.

VI. The South began to utilize its water power to make electricity for light and to run machinery.

VII. Great enterprises are being carried out successfully:

1. Coast cities have been drained and protected by walls and dikes.
2. Yellow fever, malaria, and cholera have practically been eliminated.
3. Swamps are being drained.
4. Railroads are being built.

VIII. Good state school systems are being developed.

Each of the foregoing points may be evaluated by considering its influence on the life of the people. For example: What has been the effect of the development of the manufacturing industries? What is the significance of the control of yellow fever and malaria? Questions of this type lead the pupil to judge the worth of, or evaluate, what he reads.

Provisions should be made for a sufficient amount of repetition to make the learning permanent. The material should be learned thoroughly and then re-

viewed several times. Review may take the form of reading supplementary material which treats the same points, making comparisons with earlier topics, or studying the same material from a different angle or a new viewpoint. Frequent testing will stimulate pupils to review in their study periods.

By way of application to life situations the points under discussion should be related to topics of present-day interest. If the pupils live in the North the study of the chapter, "The New South," should result in a better understanding of the people of the South and a finer appreciation of them.

Thus it will be seen that the main factors of assimilative thinking are:

1. Setting up specific aims
2. Selecting and organizing the main points
3. Evaluating these points
4. Fixing in mind the valuable parts of the material
5. Making applications to life situations

Assimilative thinking, then, is used to designate the reading type of study and to emphasize the idea that reading is not merely verbal memorizing but a process of thought getting, or assimilation.

3. Problem Solving

The term problem solving, as used in this book, comprises both problems and projects as these terms are used by Charters, Kilpatrick, Krackowizer, and

others. This inclusive use of problem solving is justified for two reasons: (1) the distinction between a problem and a project is largely a matter of definition and is too abstruse to be grasped readily by the average teacher, and (2) effective direction does not require the dividing of problematical situations into problems and projects. There would be little, if any, advantage in such a division, for the method of procedure is practically the same. In either case thinking is the essence of the situation. A few quotations from the exponents of the project method will show that the distinction between a problem and a project is largely a matter of definition and terminology. Krackowizer[1] says:

> The process of carrying out projects and problems includes thoughts, suggestions, and activities rejected as well as those finally selected as pertinent. If no steps are taken toward the attainment of a definite purpose, the mental problem may remain in the child's mind, but there is no solution of it and there is no problem involved.

Apparently, for this writer a project is a problem or any other purposeful activity carried to a successful conclusion.

Charters[2] makes this statement:

[1] Krackowizer, Alice M. *Projects in the Primary Grades.* p. 17. J. B. Lippincott Company, Philadelphia.

[2] Charters, W. W. "The Project in Home Economics Teaching." *Journal of Home Economics.* Baltimore, Md. X: 114. 1918.

First the project is a problem. This differentiates it from reflex and habitual acts such as digestion and respiration, which are normally carried on without the intervention of consciousness, or from knitting or dish-washing, when they have become habitual. Any of these may become problems, as the control of respiration by the singer or knitting to a novice. These are problems when they require thought but when they become habitual they are no longer problems.

This quotation emphasizes the idea that a project must be a problem; that habitual processes cannot be projects.

Stevenson[1] says:

The term "problem" is largely "intellectualistic in its connotation" and if it were used exclusively it would have a tendency "to overemphasize the intellectual aspect of school work." The "project," on the other hand, lays emphasis not only on the problematic situation but also on the act and on the possibility of carrying it to completion. The project makes provision for the natural setting of the teaching unit. Without the natural setting there is no project. The problem setting may be artificial, that is, it may not approximate a life situation. The project is a normal life situation, or the problem in its natural setting.

According to this writer, the problem, apparently, is artificial whereas the project approximates a life situation. A project is a problem in its natural setting.

From Stevenson, J. A. *The Project Method of Teaching.* pp. 94, 95. By permission of The Macmillan Company, publishers, New York.

Kilpatrick, as quoted by Stevenson,[1] states:

It is evident that every problem which is accepted for prosecution in the sense that its solution is willed *ex vi termini* is a project. In this sense every real problem is a project but every project is not a problem: the problem method accordingly becomes a special case—a most important one, to be sure—of the project.

It would seem from this quotation that "project" is a more general term than "problem," comprising not only problems but other types of activities, as acquiring skill or developing appreciation.

Stockton[2] holds to this view: "The project method is no more or less than the natural, concrete expression of modern principles of education in action." He says further:

If one looked for a single phrase to sum up the whole set of principles he could not find a better one than Dewey's "self-education through activities" or the common "learning to do by doing" so often quoted in the illustrations. And the important thing in relation to the original thesis of this book is that this phrase which sums up the principles—this "learning to do by doing"—is also the absolutely fundamental element in project work.

According to Stockton, the project method applies to all school work that is based upon sound

[1] From Stevenson, J. A. *The Project Method of Teaching*. p. 95. By permission of The Macmillan Company, publishers, New York.

[2] Stockton, G. *Project Work in Education*. p. 67. Used by permission of, and arrangement with, Houghton Mifflin Company, the authorized publishers, New York.

principles of education, particularly learning by doing, or education through activities.

It will be observed that the chief points of difference between the problem and the project in the foregoing citations are: (1) the project implies the idea of doing whereas the problem suggests primarily an intellectual process; (2) the project requires the activity to be carried on in its natural setting but the problem may be artificial; and (3) the project is a broader term than the problem, including habit forming, reading, and appreciation when these activities are real and not merely artificial. But these distinctions are largely differences in points of view and in terminology. They do not justify or even necessitate classifying the project as a distinct type of classroom activity. In its broader significance the project comprises all the types of activities. For example, improving one's handwriting would be a project but this, according to the present analysis, is a case of simple associative learning; reading a book, if done purposefully and whole-heartedly, would be a project, and this has been classed as assimilative thinking.

Again, the idea that a project must be carried on in its natural setting whereas a problem may be artificial is no real distinction. Modern education insists that the problem, as well as the project, must have a natural setting; consequently, this distinction is not valid. Further, to say that the

project is manual and the problem mental fails to make any clear distinction. The project may be largely, if not altogether, mental. Stevenson recognizes intellectual projects. He says, "It is not necessary that there be physical activity in the project, that is, manual activity. While it is true that physical activity is usually considered a part of the project, yet mental acts may constitute 'activity'."

Obviously, the advocates of the project method have failed to make clear-cut distinctions between projects and other types of activities, particularly problem solving. As Stockton has pointed out, the significance of the project method lies in its emphasis on some of the fundamental principles of education. Stevenson asserts that the provision for the natural setting of the teaching situation is the distinct contribution of the project method. But from the viewpoint of effective direction of activities it makes little difference whether a certain activity is classed as a problem or a project, as the method of procedure is essentially the same. Although attempting to make a distinction between problems and projects, Stevenson admits that "the project when carried to completion uses the identical steps of logical thinking." It is the steps of logical thinking, therefore, that need to be emphasized rather than the distinction between a problem and a project. These will be considered under problem solving.

Problem solving versus assimilative thinking. How does problem solving differ from assimilative thinking? Chiefly with respect to aim and method. The first step in good assimilative thinking is the discovery of the aim of the writer. Sometimes this is stated more or less clearly; again it is merely suggested in titles and paragraph headings. Whether it is stated or implied the learner must discover the aim of the selection and make it sufficiently explicit to serve as a basis for the selection and organization of the important ideas. On the other hand problem solving grows out of a felt difficulty which must be located and definitely formulated as a problem before it can stimulate and guide thinking. In assimilative thinking the first step is to determine the aim of the writer, whereas in problem solving it is to locate and define the cause of the breakdown in one's own experience.

There is also a marked difference in the method of procedure in the two types of thinking. In assimilative thinking one has merely to follow an author. To read well one must determine the aim of the author or set up a specific aim of his own, select and organize the main points, evaluating them in the light of the aim, and fix in mind the valuable parts. In problem solving one must examine the nature of the difficulty and formulate the problem for himself; then recall or collect the facts bearing on the problem, suggest a solution,

and verify the conclusions. Obviously, problem solving makes heavier demands upon the pupil's "fertility of knowledge" and upon his "sagacity" in selecting the significant elements in a problematic situation. Practically, it is the difference between following a guide and marking out one's own pathway through an unknown region. In assimilative thinking the pupil follows an author who has collected and organized his material with reference to a specific aim, whereas in problem solving he must define his own problem, plan the solution, collect and evaluate the data bearing on the problem, and draw his own conclusions.

An illustration from the schoolroom. A brief description of an actual case of problem solving follows. In a certain school the pupils of the fourth grade had spent nearly two years in a small and poorly lighted classroom—the least desirable room in the building. One day they were led to a large and well-lighted room and seated temporarily in arm chairs. After a brief rehearsal of the inconveniences of the past two years the teacher said, "You are to occupy this room next year; I want you to plan the arrangement of the room." (Was this a problem or a project?) The room had been used for other purposes and was not properly furnished for a classroom. After some discussion of the situation the problem was stated definitely in

this form: How shall we arrange this room for our work next year so as to make it convenient and attractive? Naturally, the large problem resolved itself into a number of smaller problems, such as:

1. Where should the teacher's desk be placed?
2. How many seats should be put in? How should they be arranged?
3. What will the seats cost?
4. What kind of bookcase will be needed? What will the material for this case cost?
5. How shall we decorate the room?

Each of these problems was considered, in turn, by the class under the direction of the teacher. For example, the problem of seating was dealt with in the following manner:

TEACHER: How shall we arrange the seats?
PUPILS' SUGGESTIONS:

1. Do not place the seats close together. (In the room formerly occupied the seats were almost touching one another.)
2. Place the seats so that the light will come from the left.
3. Make them face the larger blackboard.
4. Make the passageways between the seats wide.
5. Leave plenty of space in front.

One by one these suggestions were considered by the class and their bearing on the main problem elaborated until they were accepted or rejected. In a similar manner the class considered all the

other problems involved in the completion of the project.

At this point a tentative statement of the meaning of problem solving, designating a type of classroom activity, may be framed. It refers to all those cases in which difficulties are encountered, leading to the formulation of definite problems which are thought out by the pupils, under the guidance of the teacher. The essential steps or processes involved are as follows:

1. A difficulty of some sort is encountered.
2. The problem is located and given a definite formulation.
3. Possible solutions of the problem are suggested.
4. Each suggestion is evaluated in turn until a satisfactory solution is found.

Problem solving and the school subjects. Apparently, problem solving is destined to occupy a larger place in school programs than hitherto. It has long been prominent in all mathematical work and the idea that the work in thought subjects should be organized around vital problems is growing. History, geography, civics, economics, sociology, and all the physical and biological sciences offer abundant opportunities for problem solving. In fact, any subject which deals with ideas rather than with habits and attitudes may be organized wholly or in part on the basis of problems. Perhaps the work in the thought subjects should be divided

between this and the preceding type. Some of the lessons should require assimilative thinking; others, problem solving.

4. Appreciation

Appreciation as used in this connection refers particularly to the work in literature, music, and drawing. But the term *appreciation* has been used so loosely in educational literature that it will be necessary to discuss at some length its meaning.

Meaning of appreciation. Dr. Samuel Chester Parker has remarked that appreciation is one of the most undefined and loosely-used words to be found in pedagogical literature. In this respect it may be said to be a rival of the term *project* which was considered in the preceding section. Let us examine a few statements made by educational writers.

> Appreciation does not mean quiescence—far from it—neither does it concern itself with the discovery of new truth, or excellence. Rather we aim to understand and to enjoy, when the aesthetic emotions are involved, the work of the masters.—STRAYER[1]

> Appreciation is an "attitude of mind" which is passive, contemplative. It may grow out of an active attitude, or emotion, or it may lead to one, but in either case the state changes from appreciation to some-

[1] From Strayer, G. D. *A Brief Course in the Teaching Process.* p. 84. By permission of The Macmillan Company, publishers, New York.

thing else. In appreciation the individual is quiescent. —STRAYER AND NORSWORTHY[1]

To appreciate means to estimate properly. To appreciate the values of life means to estimate properly the values of life.—CHARTERS[2]

Appreciation may thus be described as the ability to follow a series of adjustments. Appreciation does not depend upon one's ability as a performer, but rather upon one's ability as an auditor.—JUDD[3]

Reasoning, or thinking, is a delayed, a deliberate, process, sufficiently pedestrian to seem devoid of mysteriousness. But appreciation, both aesthetic and moral, seems often to come as a subtle dawn or a sudden flash. In the oft-quoted words of Browning:

> "There's a sunset touch,
> A fancy from a flower bell, some one's death,
> A chorus-ending from Euripides";

and these things rap and knock at the soul in ways so unforeseen that it is not a matter of surprise to find appreciation regarded by many people as something too intangible to be susceptible to actual training in schools or institutions. The spirit here seems to "blow where it listeth"; and beauty is "a light that never was on sea or land."—HAYWARD[4]

The terms mental realization and appreciation (or

[1] From Strayer, G. D., and Norsworthy, Naomi. *How to Teach*. p. 126. By permission of The Macmillan Company, publishers, New York.

[2] Charters, W. W. *Methods of Teaching*. p. 21. Row, Peterson & Company, Chicago.

[3] Judd, C. H. *The Psychology of High School Subjects*. p. 190. Ginn and Company, Boston.

[4] From Hayward, F. H. *The Lesson in Appreciation*. p. 1. By permission of The Macmillan Company, publishers, New York.

genuine appreciation) are more elaborate names for the realizing sense of a thing. It is not possible to define these ideas except by synonyms, like "coming home to one," "really taking it in," etc., for the only way to appreciate what is meant by a direct experience of a thing is by having it.

In one of its meanings appreciation is opposed to depreciation. It denotes an enlarged, an *intensified* prizing, not merely a prizing, much less—like depreciation—a lowered and degraded prizing.

The term "value" has two quite different meanings. On the one hand, it denotes the attitude of prizing a thing, finding it worth while for its own sake, or intrinsically. This is the name for a full or complete experience. To value in this sense is to appreciate.—DEWEY[1]

Obviously, as Doctor Parker has pointed out, the term *appreciation* has no commonly accepted meaning. So far as the writer is able to discern there is no one fundamental element common to all these statements selected from representative educational writers. The views expressed are confusing and even contradictory. For example, we read in one quotation that appreciation is passive and in another that it is active; in one that it is a process of estimating values and in another that it seems to come with a subtle dawn or sudden flash. Again, appreciation is the attitude of prizing a thing or it is the ability to follow a series of adjustments,

[1] From Dewey, John. *Democracy and Education*. Chap. 18. By permission of The Macmillan Company, publishers, New York.

depending upon one's ability as an auditor. Thus the term is made to express a variety of meanings, whereas the teacher must hold consistently to some one definite meaning in order that she may effectively supervise study for appreciation. She must have a clear vision of the goal to be attained before she can plan the most economic method of procedure in reaching the goal. For the purposes of the supervision of study, therefore, appreciation must be more accurately defined. The exact meaning that one reads into the term is somewhat arbitrary but it should be definite, should be adapted to the end in view, and should lead to fruitful results.

From the standpoint of the supervision of study, therefore, what is the most fruitful meaning of appreciation? The writer believes that the best results will be obtained by accepting the views expressed by Charters and Dewey; namely, that appreciation is a process of estimating values, of prizing, of experiencing fully and completely. Moreover, this view emphasizes the original meaning of the word, which is derived from the Latin *appretiare*, to value at a price or to appraise. Adhering to this point of view, then, we may say that appreciation is a process of estimating values, of prizing, of experiencing fully or completely. Furthermore, as Judd has shown in his *Psychology of High School*

Subjects, appreciation may be described as the ability to follow a series of adjustments. The value of literature, for example, lies in the adjustments that it stimulates in the reader. The pupil may be said to appreciate "The Great Stone Face" in so far as he is able to make the appropriate adjustments or responses to this story. Similarly, he appreciates any selection of literature, music, or art, to the extent that he is able to make the appropriate reactions. It is these reactions or adjustments that must be stimulated and guided in the supervision of study. To supervise study is to stimulate and guide a series of reactions, responses, or adjustments. Consequently, the teacher must know definitely what reactions a pupil should make in order that he may be said to appreciate a selection of literature, music, or art. What reactions should literature, for example, provoke in the pupil who has the proper basis in experience for appreciation? Principally, those that follow.

1. Ideas and images. Most of the selections of literature that deserve a place in the course of study have some sort of ideational content to which the pupil ought to respond. Many selections have a great idea as a central theme, the comprehension of which is essential to appreciation. For example, a pupil could hardly be said to appreciate "The Bluebell" if he fails to grasp the main idea as it is expressed in the last stanza.

Similarly, in all great literary productions there is a central theme and idea, or group of related ideas, that must be comprehended if the selection is to be appreciated. In some selections humor is the content to which the pupil ought to respond; and humor may range all the way from trivial incongruities to the wittiest discussions of profound truths. To fail to sense the humor in such selections is to fail in appreciation. Still other selections have sense experiences, or imagery, as their main content. Of this group "October's Bright Blue Weather" is typical. The author of this poem appeals primarily to the reader's sense experience, to the imagery of his past experience. A few selected stanzas will be sufficient to illustrate this point:

O suns and skies and clouds of June,
And flowers of June together,
Ye cannot rival for one hour
October's bright blue weather;

.....

When gentians roll their fringes tight
To save them for the morning,
And chestnuts fall from satin burrs
Without a sound of warning;

When on the ground red apples lie
In piles like jewels shining,
And redder still on old stone walls
Are leaves of woodbine twining;

—HELEN HUNT JACKSON[1]

[1]Copyrighted by Little, Brown & Company.

To appreciate this poem the pupil must be able to image the bright blue of October's skies, the chestnuts falling from satin burs, piles of red apples on the ground, and bright colored leaves on the old walls. In short, he must be able to recall and revel in the sensory delights of the autumn time. Similarly, he must be able to react to all selections making their appeal primarily to the pleasures of sensory experiences.

In order to appreciate, therefore, a pupil must react to the content of a selection. He must respond to the content by grasping the central idea, sensing the humor, or recalling the images of his past experience. This reaction may be full and complete or partial and incomplete. In the latter instance the pupil fails in appreciation but the reaction may be worth while.

2. Feeling or emotion. The reaction to the content should lead naturally to the proper emotional reaction. Teachers should have clearly in mind, however, what kind of emotional reaction is appropriate and desirable. Otherwise, they may stimulate and guide the pupils to make weak or improper reactions. What kind of emotional reaction is essential to appreciation? Should one read for pleasure or to acquire ideas and arouse feelings that will take effect in controlling conduct for ideals? For example, should the pupil react to

"Which Loved Best" by merely feeling pleasure as he reads the poem, or should the reading lead to his being more kind and helpful to his own mother? Obviously, the proper emotional tone is a correlate of the content. There are no end organs of pleasure by means of which feelings may be aroused through direct stimulation. Feeling is the affective phase of sensations, perceptions, images, and ideas. Consequently, if the pupil makes an appropriate and thoroughgoing reaction to the content, he perforce creates or arouses the proper feeling tone. Thus the emotional reaction is determined by, and is dependent upon, the content of the selection. This being true, the content is the essential factor. Guide aright the pupil's reaction to the content of a selection and the proper emotional tone will occur as an integral part of the total experience. Strive to perceive, to image, to think, and the emotional tone will be thereby aroused.

The nature of the emotional reaction is therefore properly determined by the content of the selection. Any selection which has a great idea as its central theme should arouse strong feeling which will tend to refine the emotional nature and to modify the reactions to life situations, whereas a selection that has merely humor or sense-experience as its content should arouse an emotional tone the chief value of which lies in the pleasure it affords. To

supervise study effectively the teacher must clearly distinguish between the two types of selections and the emotional responses which naturally accompany them. A common mistake is to read all selections for pleasure, to confuse appreciation with enjoyment.

3. Elements of technique. The appreciation of literature requires also a sense of the appropriateness of the elements of technique employed by the author to give effective expression to his thoughts and feelings. The pupil in the elementary school, however, should not be expected to respond to all the fine points of technique; he will do well if he becomes familiar with the common elements: imagery, rhythm and rime, well-chosen words and phrases, and figures of speech. With older pupils more emphasis may be placed on this phase of appreciation but technique should never be made an end in itself. The elements of technique should be considered as a means of effective expression and be evaluated from this viewpoint.

Summary of section. We may summarize the main points in this section thus:

1. Appreciation is a process of estimating values, of prizing, of experiencing fully and completely.
2. Appreciation may be described as the ability to make a series of appropriate reactions.
3. Chief among these reactions are: (1) grasping the central idea, sensing the humor, or recalling the images

of past experience, (2) feeling the emotion which naturally accompanies the content, and (3) understanding and evaluating the common elements of technique as a means of expression.

4. A common mistake is to confuse appreciation with enjoyment, and read all selections for pleasure.

Appreciation versus assimilative thinking. Appreciation is closely akin to assimilative thinking. It differs from assimilative thinking, however, in placing greater emphasis on the emotional phase of the activity. In assimilative thinking the thought content is always primary and the feeling element secondary, usually passing unnoticed, whereas in appreciation that requires thinking the thought arouses a distinct emotional tone which gives value to the experience. Again, appreciation may not require thinking. For example, some selections of literature have no valuable thought content; they please because they tell a story, present a humorous situation, or move in rhythmic time. To appreciate "The Owl and the Pussy Cat" requires little if any thought but a feeling for melody and a liking for nonsense. Briefly, then, we may say that unemotionalized thought is the fundamental element in assimilative thinking, whereas emotionalized thought —in so far as thinking is required—is the primary element in appreciation.

Appreciation and the school subjects. Thus far

we have dealt only with the appreciation of literature. This was necessary for convenience of treatment but appreciation is an important element in two other school subjects: music and art. The factors of appreciation are essentially the same in these subjects as in literature. Most of the points brought out in the discussion of literature apply equally well to music and art.

III. Summary

The most economical method of treating supervised study is on the basis of types of classroom activities. For convenience of treatment practically all school activities may be grouped around the following types as defined in the previous sections:

1. *Simple associative learning*, comprising the exercises in spelling, handwriting, stenography, typewriting, and parts of other subjects.

2. *Assimilative thinking*, meaning thoughtful or reflective reading. This type of work is important in all the thought subjects. The essential factors of this type of work are: (1) having a specific aim, (2) selecting, organizing, and evaluating the main points, (3) memorizing, or fixing in mind the valuable parts, and (4) applying, or using the ideas.

3. *Problem solving* (designating all exercises in which difficulties are encountered), leading to the formulation of definite problems which are thought out by the pupils under the guidance of the teacher. The essential processes are: (1) a difficulty is encountered, (2) the problem

is located and defined, (3) possible solutions are suggested and (4) each suggestion is evaluated until a satisfactory solution is found. This type of work should occupy a large place in all the thought subjects.

4. *Appreciation*, which may be described as the ability to make the following reactions: (1) grasping the thought content, (2) feeling the appropriate emotion, and (3) understanding and evaluating elements of technique as means of effective expression. This type of work is the predominant element in literature, music, and art.

CLASS EXERCISES

1. Is it more economical to treat supervised study on the basis of types of classroom exercises or by subjects? Make a list of the arguments for and against the type method of treatment.

2. State clearly the meaning of simple associative learning. Give several illustrations of simple associative learning from your experience in teaching or from observation.

3. What do you understand by assimilative thinking? Give several illustrations from the classroom.

4. What is meant by problem solving as the term is used in this chapter? Give several illustrations from the chapter and from other sources.

5. What is the difference between a problem and a project? Does problem solving properly include all the activities growing out of problematical situations? Prove your conclusion.

6. Is it necessary for the purposes of supervised study to make a sharp distinction between problems and

projects? Try to prove, or verify, your conclusion.

7. What is the meaning of appreciation as defined and described in this chapter? Criticize this view of appreciation.

8. Read carefully the quotations from educational writers on appreciation. Collect statements from several other writers. Make a definition, based upon your reading, of appreciation. How many of the writers are in substantial agreement with the view set forth in this chapter?

9. Visit several classrooms and make brief notes on the exercises observed. Can all these exercises be classified under the four types described in this chapter? Prove your conclusion.

10. Classify under these four types the following exercises:

1) A silent reading lesson
2) A drill lesson in the fundamental operations of arithmetic
3) A spelling lesson
4) A textbook lesson in geography
5) A history lesson based upon the textbook and references
6) A lesson in handwriting
7) The study of a poem in the seventh or eighth grade.
8) A word drill in the first grade
9) A phonic drill in the first grade
10) A lesson in arithmetic consisting of a number of problems
11) A practice lesson on the typewriter
12) A lesson in music or art

11. Analyze several of the school subjects to determine the types of learning involved. Special assignments may be made and the reports evaluated in class.

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(These chapters discuss the problem method, the project, appreciation, and drill.)

PART TWO

FACTORS OF STUDY AND HOW TO PROVIDE FOR THEM IN DIRECTING CLASS STUDY

CHAPTER V

FACTORS OF SIMPLE ASSOCIATIVE LEARNING

Questions to Be Kept in Mind When Reading

1. What are the main factors in simple associative learning?
2. How, and to what extent, does each of these factors affect the rate of learning?

Simple associative learning, it will be recalled, refers to exercises in the acquisition of skill, to drill, to habit formation, and to the forming of simple connections between stimuli and the appropriate responses. If teachers are to supervise this type of learning they must have definite knowledge of the factors involved. To point out and illustrate these factors is the specific aim of this chapter.

I. Motivation

1. The meaning of motivation. Learning takes place only under the impulsion of some motive. Genuine motivation always comes from within. Consequently, if school work is to be motivated properly, it must be related in some way to the pupil's instinctive tendencies or innate drives. The study of some simple cases of animal learning will reveal the fundamental nature of motives.

The following illustrations are taken from Thorndike's[1] *Educational Psychology*. In studying these cases note particularly the part played by motivation.

1. The learning of chickens. A number of chicks were placed in a yard with an adjoining maze of simple construction. Then one chick was taken from the group and placed at a certain point in the maze. The absence of other chicks, of food, and of familiar surroundings impelled the chick to react to the situation by jumping against the walls of the maze, chirping, and running from place to place. These random reactions were repeated until finally it found its way out. With repeated trials the useless reactions became fewer in number until finally the chick would run directly out of the maze into the yard. Now how did the chick learn? What made it react? Obviously, the chick learned through *its own reactions* and these were impelled by *inherited tendencies or inner drives*, such as hunger and the discomfort of being alone.

2. The learning of kittens. A hungry kitten was placed in a box, the top and front of which were covered with bars an inch apart. A door was arranged in the front side of the box so that it would fall open if the kitten turned a button from a vertical to a horizonal position. A bit of fish was placed outside, the sight and smell of which stimulated intensely the tendency to seize and devour food. As a result of this stimulation, the kitten tried to squeeze through the bars, clawed at the bars and at loose things in the box, stretched its paws out between the bars, and bit the walls and bars.

[1]Thorndike, E. L. *Educational Psychology*. Vol. II. Chap. II. Teachers College, Columbia University, New York. 1913.

It made various specific reactions to various parts of the cage until finally it hit upon the right reaction and freed itself. With repeated trials the random movements were gradually eliminated until the kitten could turn the button and free itself without going through the useless movements. It had now learned to get out. The learning progressed slowly by the "trial and error method," but there would have been no learning if the stimulus outside had not been met by some inner need of the kitten's organism. If hunger had been entirely absent and sleepiness had been present, the kitten would have lain down to rest and there would have been no learning.

From these illustrations it is apparent that motivation is a fundamental element in animal learning, for without motivation there would be no reactions and without persistent reaction there would be no learning. Further, the stimulus makes its appeal to some such organic need as hunger or to some such inner tendency as gregariousness. Similarly, human learning takes place in response to motives of some sort. The human, as well as the lower, animal is impelled by organic needs and inner tendencies. Moreover, the child as well as the chick learns through his own reactions and these are impelled by inner drives or motives. It is these inner driving forces that constitute motivation. By motivation, therefore, we mean a driving force resulting in a reaction or a series of reactions. Motivation is the drive that carries forward an activity.

2. The sources of motivation. From what was said in the previous section it follows that the pupil's native equipment is the fundamental source of all motivation. This is true particularly of his instincts and capacities. These furnish the drives for all human activity. They are therefore the fundamental drives in all schoolroom activity. Consequently, some knowledge of the child's native equipment is indispensable to the teacher who would be skilful in motivating school work. This knowledge is readily accessible, however, in the many good books on educational psychology with which all teachers should be familiar. All that will be undertaken in this chapter is a brief discussion of instincts and capacities in relation to the problem of motivation.

1) The instincts. The basic nature of instincts in motivation has long been recognized and emphasized by psychologists. Thus Peterson and David[1] write:

> The instructor who is to be most successful, therefore, in training others must keep in mind some of the elementary principles of behavior; he must not forget that external stimuli to effort or activity are means of bringing about action because *they are related to inner needs and instinctive tendencies of the individual organism* and because they somehow give expression to the innate dispositions of the individual.

[1] Peterson, Joseph, and David, Q. J. *The Psychology of Handling Men in the Army.* p. 92. The Perine Book Company, Minneapolis, Minn.

In like manner, McDougall[1] writes of the instincts. He says:

> We may say, then, that directly or indirectly the instincts are the prime movers of all human activity; by the conative or impulsive force of some instinct (or of some habit derived from an instinct), every train of thought, however cold and passionless it may seem, is borne along towards its end, and every bodily activity is initiated and sustained.

Similarly, other psychologists write of the native tendencies, emphasizing the point that they are the foundation of all human learning and that they are the chief source of motivation. Instincts are probably not the only source of motivation, as some claim, but they are indisputably the chief source of driving power. The teacher who would be successful, therefore, in motivating school work must know how to utilize the pupil's native tendencies. The following list of these tendencies, though incomplete, is particularly important:

Collecting and hoarding
Rivalry and coöperation
Love of approbation of teacher and of fellow pupils
Imitation, curiosity, and play
Manipulation or constructiveness
Mastery and display

This list indicates how wide and varied are the op-

[1] McDougall, William. *Social Psychology*. p. 44. John W. Luce & Company, Boston. 1914.

portunities for motivation through instinctive tendencies. Almost any lesson may be motivated by appealing to one or more of the instincts.

2) The capacities. The capacities differ from the instincts in that they are adaptations to the more special features of the environment. Capacities are aptitudes for dealing with certain kinds of materials. For example, a pupil may have an aptitude for music or mathematics or some other school subject. This capacity is not present, however, in the form of ready-made reactions to stimuli. We do not expect the pupil with a special capacity for music "to break out" in song but we do expect him to manifest an interest in music and learn it readily. As a rule, however, capacities are general rather than special: that is, a pupil who is good in one school subject tends to be good in all. Consequently, every normal child has some capacity, great or small, for each of the school subjects. Moreover, each capacity is a source of motivation for adaptations in its special field. Every inherited mechanism, whether instinct or capacity, is a source of motive power. On this point Woodworth[1] asserts:

> Now there is no obvious reason in the nature of things why the more general adaptations should have the character of drives while the more specialized adapta-

[1] Woodworth, R. S. *Dynamic Psychology.* p. 75. Columbia University Press, New York. 1918.

tions should exist simply as passive mechanisms. There is no obvious reason why this should be so and there is no evidence that it is so, the evidence from specialized activities of men and from their power to become absorbed in these activities being quite to the contrary. We are justified, therefore, in concluding that the native capacities are essentially in the same position as the instincts as regards this matter of drive.

In less technical terms, the foregoing statement means that the capacities as well as the instincts are sources of motive power. The absorption of great men in their work and their intense application for hours at a time go to prove that driving power is inherent in capacity.

Thus we see that the range of human motives may be much wider than the instincts. Each capacity is a possible source of motive power. The pupil will readily become absorbed in the subject matter for which he has a large capacity. This absorption means that the attention is wholly directed upon the subject matter, that the pupil is absent-minded with respect to everything else in his environment, that he is being carried along by his interests in the subject. Interest as used in this connection may be conceived as the affective side of a native capacity in action. In a derived sense, therefore, we may speak of *interests* as *motives* and, in this sense, interest is closely correlated with capacity.

The capacities are therefore a second great source of motivation. When the pupil is reacting to subject matter for which he has large capacity and adequate preparation, the situation has inherent in it its own drive. No sugar coating, no further motivation of any sort is necessary, for the pupil will readily become absorbed in the activity. On the other hand if the pupil has but little capacity for the subject and he has been advanced more rapidly than his ability warrants, interest in the subject will prove to be woefully inadequate. In such cases motivation may be strengthened by appealing to one or more of the instinctive tendencies, the other great source of motive power, but nothing can fully compensate for lack of capacity.

3. External incentives. By external incentives is meant rewards that are external to the process of learning. Perhaps no one will doubt that interest in the work itself is superior as a motive to external incentives, but opinions will differ on the following question: Should the teacher resort to incentives to stimulate effort? There is not much reliable data bearing on this question. So far, one experimental study has come to the notice of the writer.

Chapman and Feder,[1] using as subjects thirty-six pupils from grade 5A of the Cleveland Demon-

[1]Chapman, J. C., and Feder, R. B. "The Effect of Incentives on Improvement." *Journal of Educational Psychology*. VIII: 469-474. Warwick and York, Inc., Baltimore, Md.

stration School, performed an experiment designed to determine the influence of incentives on the rate of improvement. They used the following tests in the experiment: (1) the Simple Addition Test used by Thorndike; (2) the Cancellation Test described by Woodworth and Wells; and (3) the Digit System Test (Substitution Test) in which figures are substituted for numerals.

The pupils were divided into two equal groups, known as A and B, on the basis of their initial scores on the Addition Test. Then they were given ten daily practice periods in each of the tests chosen for the experiment. The daily time allotments were ten minutes for the Addition Test, one minute for the Cancellation Test, and five minutes for the Substitution Test. The final data were computed from the records of sixteen pupils from each group, four of the records being eliminated on account of the absence of the pupils. Throughout the practice the following external incentives were employed with Group A, while Group B was stimulated merely by the interest in the processes themselves:

1. The publication of the results of the previous day.
2. Marking in heavy blue pencil, on sheets presented for the day's work, the point reached by the pupil on the previous day.
3. Exhibiting a graph showing the general improvement of the class.
4. Credit in the form of stars to the upper 50% in the previous day's performance.

5. Prizes of nominal value to the upper 50% in the class on the basis of gross improvement made in the ten practice periods.

The results are summarized in Table XIII which gives the average scores of the first two and the last two practice periods in each test and for each group.

TABLE XIII. SHOWING THE INITIAL AND FINAL SCORES OF BOTH GROUPS ON ALL THE TESTS

Function	Group	Average of First Two	Average of Last Two	Gross Gain	Difference
Addition	A	15.8	21.7	5.9	
	B	13.7	12.1	−1.7	7.6
Substitution	A	91	216	125	
	B	86	174	88	37
Cancellation	A	34.2	54.7	20.5	
	B	36.1	50.9	14.8	5.7

Note the following comment upon the results of the tests:

From the nature of the experiment and the range of individual differences in the class, the probable error of each isolated value in the table is somewhat great, but the general trend of the results shows that the incentive exerted a considerable effect on the amount of the

product. . . . If such large results are found over short periods of work of fifty and one hundred minutes, what must be the failure to secure maximum effort when the work extends over fifty or a hundred hours!

The foregoing conclusions are based upon a meager amount of data and are therefore not very reliable. But, in so far as they are valid, they show a considerable advantage in favor of the group working under the influence of external incentives. Apparently, teachers may well use external incentives to supplement the drive that is inherent in capacity for any particular type of activity. Their potency, however, lies largely, if not altogether, in the fact that they are simply devices for making available some of the motivation inherent in the instinctive tendencies. In other words external incentives are effective because they appeal to instinctive tendencies, such as rivalry, display, and ownership.

In a similar experiment to determine the value of praise and reproof as incentives, Elizabeth B. Hurlock[1] found that children work better under the stimulus of either praise or reproof. Praise and reproof are about equal in value in their effect on the score but praise fosters an attitude of enjoyment and an interest in school work.

II. Selection of Relevant Responses

A second important factor in simple associative

[1]Hurlock, Elizabeth B. "The Value of Praise and Reproof as Incentives for Children." *Archives of Psychology.* No. 71.

learning is the selection of the relevant responses. When the learning involves no new motor adjustments the selection of the right responses offers no difficulty. If the stimulus is *six times seven*, the pupil can refer to a table of number combinations and obtain the correct response or the teacher can tell him. But in cases of learning involving new motor adjustments the selection of the relevant responses is a slow and laborious process. In learning to write, for example, the pupil's early efforts are characterized by many irrelevant movements. He grips his pencil too tightly; he distorts his face; he assumes incorrect postures and his hand cannot be induced to move in the desired direction. Thus his nervous energy overflows into many useless channels. But there is no other way for the pupil to learn: progress is made through the elimination of useless movements. Perhaps the accompanying diagram, Figure I, will aid in understanding the nature and function of these random movements.

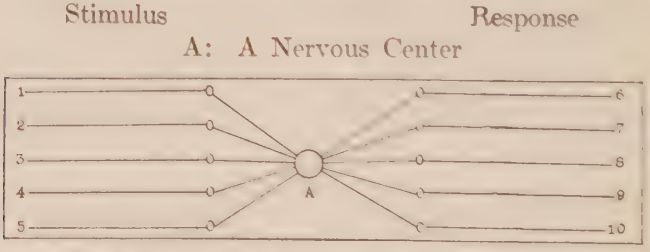

Figure I. Illustrating how relevant responses are selected.

In Figure I, suppose that 1, 2, 3, 4, and 5 represent stimuli and 6, 7, 8, 9, and 10 responses that may be made to these stimuli acting in turn. Then stimulus 1 may connect, through the nervous center A, with either response 6, 7, 8, 9, or 10, or with all of them at the same time. And the same is true of stimulus 2, 3, 4, or 5. Suppose now that the pupil is trying to make response 9 to stimulus 1. He cannot do so without a period of "trial and error," for the nervous energy will flow just as readily, perhaps, into response 6, 7, 8, or 10, or into all of them at the same time. In attempting to make response 9 the pupil will also make responses 6, 7, 8, and 10, none of which is relevant. With repeated trials he finally hits upon 9, which is the right response. With practice he makes the correct response more and more frequently and with greater certainty and accuracy. At the same time the wrong responses are made with diminishing frequency until at last the random or irrelevant movements are all eliminated. Thus progress is made through the gradual elimination of the wrong responses and the perfecting of the right response so that it can be made with greater speed and accuracy. When the learning is complete the resistance of the synapses in the path from stimulus 1 to response 9 has been lowered so that the nervous impulse readily traverses this path. In other words the connection between 1 and 9

has been strengthened by exercise and the other connections have been weakened by disuse.

Of course, the nervous system is many times more complex and the number of possible random movements many times greater than Figure I would indicate. Consequently, the selection of the right response is a difficult and laborious process and the method of selection is one of the most troublesome problems in connection with simple associative learning. The method of selection is more or less in dispute but a few theories will be reviewed briefly and quotations made from the proponents of these theories.

1. Thorndike[1] attributes selection to two factors chiefly: (1) the satisfyingness of the response and (2) the set or attitude of the organism. He concludes his discussion of "Learning by Analysis and Selection" by saying:

> The facts are that in purposive thinking and action, as everywhere else, the bonds are selected and retained by the satisfyingness, and are killed off by the discomfort, which they produce; and the potency of man's set or attitude to make this satisfy and that annoy—to put certain conduction units in readiness to act and others in unreadiness—is in every way as important as its potency to set certain conduction units in actual operation.

[1]Thorndike, E. L. *Educational Psychology, Briefer Course.* p. 172.

2. Book,[1] from his study of the learning of typewriting, concludes that all new adaptations are made quite unintentionally. They are fallen into and seem to be made unconsciously. One of his subjects, Z, wrote in his introspective notes:

> I have been surprised at how little control I have over the way attention works. We may do much toward keeping it concentrated on the work, but all improvements in method are unconsciously made. . . . The best thing the learner can do is to keep himself in perfect condition and strenuously but properly applied to the work; the organism will do the rest.

3. Peterson[2] explains selection on the basis of consistency. He maintains that selection is due to the entire conformation of the organism to stimulating conditions or to the cumulative effect of various incomplete and partial responses. For the complete presentation of this view the reader is referred to the original article to be found in the *Psychological Review*, XXIII: 153-162. Practically the same view is presented in brief form in the following excerpt:

> Only certain acts are repeated, the most fit ones, that is, those that are most fit for the purpose in view (or for the needs of the organism, or acts accidentally as-

[1] Book, W. F. *The Psychology of Skill.* p. 97. The Gregg Publishing Company, New York. 1925.

[2] Peterson, Joseph, and David, Q. J. *The Psychology of Handling Men in the Army.* The Perine Book Company.

sociated with such needs, when no conscious purpose is present).

Learning is therefore largely a process of *selecting* from many random acts those most fit for the purpose, or most successful for the attainment of the thing to be accomplished. Often, it must be noted, this selection is not done consciously, and the individual can give no satisfactory statement of the selection later or say how it was brought about.

Thus various theories have been proposed to explain the factor of selection, none of which is wholly convincing. The difference in these theories, however, is largely one of emphasis and point of view. For example, *satisfyingness* and *fitness* may be just different phases of a total experience. It may be fitness that makes a response satisfying. At any rate it seems reasonable to believe: (1) that it is the whole organism that selects; (2) that selection is often unconscious; and (3) that the important factors concerned in selection are the set of the organism, the satisfyingness of the response, and the fitness of the response for attainment of the purpose in view.

III. Length and Distribution of Practice Periods

The discussion of practice periods centers around a few main problems:

1. How long can pupils practice profitably at one time?

2. How should practice periods be distributed? Should they come twice a day, daily, on alternate days, or weekly?

3. Should practice periods be equal in length throughout the practice? Or should the periods decrease in length toward the end of the practice?

Obviously, these problems are of great practical significance to the elementary teacher in arranging her daily program and to the high school principal in making a schedule of classes for the high school. For example, how much time should be given to handwriting and how should this time be distributed? Or how long should the practice periods in typewriting be and how should these periods be distributed? Doubtless there is an optimum length and distribution of practice periods for each subject or type of learning but, unfortunately, our knowledge is limited on these points. There is however a considerable body of experimental data bearing on the problems stated at the beginning of this section. A few typical studies in this field will be reviewed briefly in the following pages.

1. Starch[1] made an investigation to determine the best distribution of practice in a substitution test. The material which he used consisted of six blanks, containing a keyboard at the top and connected prose at the left to be transcribed, sub-

[1]Starch, Daniel. *Journal of Educational Psychology.* III: 209-213. Warwick and York, Inc., Baltimore, Md.

stituting numbers for the letters according to the key.

Forty-two students acted as subjects. They were divided into four groups, each with a different distribution of time:

Group I, numbering 12, worked 10 minutes twice a day for 6 days
Group II, numbering 14, worked 20 minutes once a day for 6 days
Group III, numbering 9, worked 40 minutes every other day for 6 days
Group IV, numbering 7, worked for 120 minutes, all at one time

The total time for each group was therefore 120 minutes, the difference being in the distribution of the time.

The results are summarized in Table XIV. The scores are estimated from the graph, there being no table of results included in the report of the experiment. Consequently, they may be only approximately correct.

Starch concludes that within the limits of this experiment the shorter and more numerous are the periods of work the more rapid is the improvement. But his data do not fully justify this conclusion. The advantage is clearly in favor of the relatively short periods but the 20-minute period daily is approximately as good as the 10-minute

TABLE XIV. SHOWING THE INITIAL AND FINAL SCORES OF EACH GROUP, THE GROSS GAIN AND THE PERCENTAGE OF GAIN, IN TERMS OF THE AVERAGE NUMBER OF SUBSTITUTIONS PER MINUTE

Group	Initial Score	Final Score	Gross Gain	Percentage of Gain
I	18.5	52.5	34.0	184
II	17.8	51.0	33.2	187
III	19.5	39.5	20.0	102
IV	17.0	27.0	10.0	59

period twice a day. In fact, on the basis of percentage of gain Group II is slightly in the lead. On the whole, however, the differences between Group I and Group II are so small as to be practically negligible. Moreover, the number of subjects in each group is too small to yield reliable data. This is particularly true of Groups III and IV. Furthermore, there is nothing in the report to show that the groups were equal in learning ability, which detracts not a little from the value of the experiment.

2. The writer repeated, in part, Starch's substitution, as outlined in his *Experiments in Educational Psychology*, with a class of first-year normal students, numbering thirty-eight. The class was divided into two groups, equal in number and approximately equal in learning ability as determined by

Terman's Group Test of Mental Ability and the grades in educational psychology for the previous semester. One group worked 10 minutes once a day for twelve days and the other group 20 minutes on alternate days for twelve days. Thus the total amount of time was the same for both groups, the difference being in the distribution of this time. All the work was done in the class periods and under the immediate supervision of the teacher. The results are summarized in Table XV and in Figure II. The scores are given in terms of the average number of substitutions per minute.

In this type of work the 10-minute period daily proved to be more economical than the 20-minute period on alternate days. The 10-minute group surpasses the 20-minute group in both gross gain and percentage of gain and the difference is large enough to be significant.

3. Pyle,[1] in a substitution test, required a group of students to spend seventeen days in a check experiment in which all used the same length and distribution of practice periods. Then one subject worked 15 minutes at a time, one 30 minutes, one 45 minutes, and one 60 minutes, for seventeen days. The record of each subject was compared with his records in the check experiment. It was found that

[1] Pyle, W. H. "Economical Learning." *Journal of Educational Psychology*. IV: 148-158. Warwick and York, Inc., Baltimore, Md.

TABLE XV. SHOWING THE INITIAL AND FINAL SCORES AND THE GAIN OF EACH GROUP

Group	Initial Score	Final Score	Gross Gain	Percentage of Gain
I (10 min.)	17	56	39	229
II (20 min.)	18	46	28	156

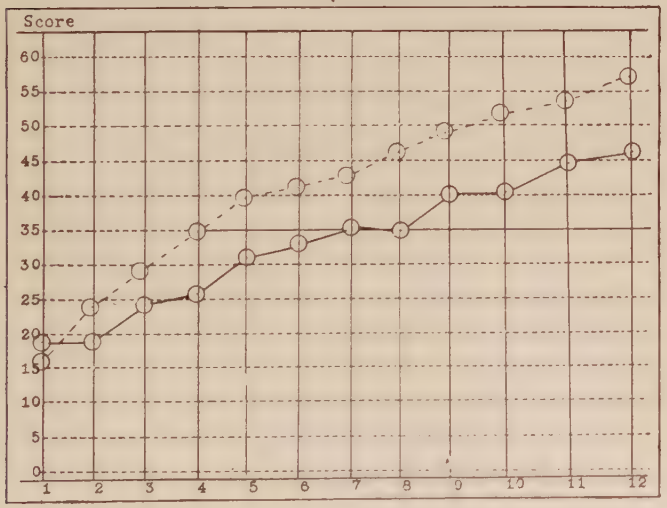

Figure II. Showing the progress of the two groups in the Substitution Test. The broken line represents the 10-minute group; the solid line, the 20-minute group.

on the basis of percentage of improvement the 30-minute period gave the best results while, on the basis of final speed attained, the 45-minute period proved to be best. Neither the long nor the short period proved to be economical. Similarly, Pyle investigated the best interval between practice periods and found that daily practice gave better results than practice on alternate days.

A similar experiment was performed with a group of third-grade pupils practicing addition. The pupils were divided into two groups, equal in number and in ability as determined by an initial test in addition. One group practiced 10 minutes daily for ten days while the other group practiced 10 minutes twice a day for five days. Thus both groups practiced the same amount of time but with different distribution.

The results of this experiment are summarized in Table XVI. The score is in terms of the number of additions made in each practice period and are estimated from a graph. The difference is in favor of daily practice and is probably large enough to constitute a significant difference.

From the foregoing experiments and similar ones Pyle drew the following conclusions:

In habit formation an adult can practice profitably for something like thirty minutes daily. The length of time for practice doubtless varies with individuals and

TABLE XVI. SHOWING THE INITIAL AND FINAL SCORES AND THE GAIN OF EACH GROUP

Group	Initial Score	Final Score	Gross Gain	Percentage of Gain
Daily	117	195	78	67
Twice daily	116	160	44	38

with the stage of the fixation of the habit. If practice is extended beyond thirty minutes there may be some return for the extra time but it is relatively small. It is quite probable that in the later stages of habituation the length of the practice period could be shortened and the interval lengthened with practically as much return. A second practice on the same day is not quite as beneficial as the first practice. After a few practices further practice on the same day is useless.

4. Lyon[1] performed a series of experiments dealing with the relation of the length of material to the time taken for learning it and with the best distribution of practice periods. The results of this investigation are too extensive to be summarized here but with respect to the best distribution of time Lyon drew the following conclusions:

[1]Lyon, W. O. "The Optimum Distribution of Time." *Journal of Educational Psychology.* V: 155-163. Warwick and York, Inc., Baltimore, Md.

With reference to the problem of the *most favorable distributions of single readings*, referred to several times in the preceding pages, I would say, "The most general statement that can be made, taking all material and methods of presentation into consideration, is that the most economical method is to distribute the readings over a rather lengthy period—the intervals between the readings being in arithmetical proportion. For example, with one individual in memorizing a poem of twenty stanzas the highest retentiveness was obtained by distributing the readings as follows: 2 hours, 8 hours, 1 day, 2 days, 4 days, 8 days, 16 days, 32 days, etc."

5. Cummins[1] made an investigation of the problem of the distribution of practice, in which he compared practice periods of approximately equal length with practice periods decreasing progressively in length. He used as subjects both school children and adults. The experiments with the children were conducted in history, geography, and arithmetic (addition and division) and as nearly as possible under usual school conditions.

The pupils were divided into two groups approximately equal in initial ability, differences in initial ability being eliminated by the "pairing off" method, that is, dropping the initially better from one group and the initially poorer from the other group until the two groups were equal in initial average ability.

[1] Cummins, R. A. *Improvement and the Distribution of Practice*. Teachers College, Columbia University, Contributions to Education No. 97.

Then one group followed an equal and the other a reducing time schedule. For example, in one experiment the equal schedule was made up of six 20-minute periods while the time of the reducing group was distributed thus: 20, 15, 12½, 12½, 10, 10, 7½, 7½, 5, and 20 minutes. The total time was the same for both distributions. Various distributions of time were used in the different experiments but, in each case, there was an equal and a reducing schedule totaling the same amount of time. An attempt was made to equalize all the factors for the two groups except the time distribution. Both the initial and final tests and the daily practice, with few exceptions, were conducted by the experimenter himself.

The subjects participating in the experiment consisted of pupils, numbering 699, in grades 3 to 8 in the Lyndhurst public school; pupils, numbering 785 in grades 3 to 8 in seven Ohio village schools; and first-year students, numbering 157, in the State Normal College of Bowling Green, Ohio. These do not include the adults learning French, this part of the experiment being omitted from the following summary.

The results are summarized, in slightly modified form, in Table XVII, which is taken from Cummins' Report, p. 64. (see p. 188.)

Average ratio of reducing schedule to equal

TABLE XVII. SHOWING THE AVERAGE GAIN IN ACCURACY FOR BOTH GROUPS IN ALL THE EXPERIMENTS

Place	Grade	Material Used	Initial Per Cent Correct		Gain in Per Cent Correct		Reduction Equal (Gain)
			Eq. Gp.	Re. Gp.	Eq. Gp.	Re. Gp.	
Lynd.	7	Geog.	77.55	74.88	1.44	8.91	6.19
Lynd.	6	Geog.	76.74	72.72	.47	1.54	3.28
Lynd.	6	Hist.	72.67	77.26	.87	3.42	(3.93?)
Lynd.	3,4	Add.	59.86	52.92	−1.27	6.94	5.46?
Lynd.	5	Div.	87.54	85.00	6.57	7.86	1.20
Ohio	8	Geog.	65.77	65.20	29.38	25.85	.88
Ohio	7	Hist.	65.67	62.98	12.56	32.68	2.60
Ohio	6	Hist.	67.15	69.55	16.27	22.00	1.33
Ohio	5	Geog.	57.93	45.81	14.14	34.82	2.46
Ohio	3,4	Add.	43.28	45.85	5.90	8.95	1.52
B. G.	Adults	Add.	88.93	87.30	4.06	5.94	1.46

schedule 2.64; Standard Deviation 1.74; Probable Error t.—obt. av. .371, which means that there are about three chances out of a thousand that in an extended series of similar experiments the reducing schedule would show no advantage. From all his data Cummins concludes:

> The final result is thus an advantage of five to fifteen per cent in favor of practice distinguished chiefly by

decreasing period lengths and increasing intervals but also by other differences. Until the effects of these other factors have been more fully studied the psychology of the results obtained here remains somewhat obscure. For educational practice the outstanding fact is that the same amount of time gave notably better results when distributed according to the reducing schedule than when distributed evenly.

Summary of section. It would be unsafe to infer that what is true of one type of learning with respect to the distribution of practice would be true of any other type. The best distribution of practice for any particular type of learning or school subject can be determined only by experimentation but the foregoing data lend support to the following conclusions:

1. Each type of learning has its own best length and distribution of practice periods.
2. Relatively short periods coming once or twice a day are better than longer periods coming less frequently.
3. A reducing time schedule will give better results than an equal time schedule.
4. Repetitions with increasing intervals will be more effective than an equal number of repetitions separated by equal intervals.
5. It is probable that these principles hold good for the school subjects, although we do not know certainly to what extent they are valid. Teachers and administrators would do well to consider these points in arranging daily programs and schedules.

IV. A Knowledge of Results

A fourth factor affecting the rate of learning is a knowledge of one's progress. Apparently, success stimulates to more intense effort, while failure indicates the need of closer application to the work in hand. Moreover, the learner must know the nature and extent of his errors if he is to make any specific attempt to correct them. A few experimental studies have been made in this field, which will be reviewed briefly.

1. Arps[1] made an investigation to determine the influence of *awareness* as a factor in work. Three subjects participated in the experiment and three series of records were taken by means of the Bergstrom ergograph. The method common to ergographic work prevailed. In each series of records the observer at one time remained in comparative ignorance of the amount and character of the work that he was doing; at another time he was given every opportunity to observe his work and to study the results.

Arps found a considerable advantage in favor of working with a knowledge of results. In summarizing his data he states:

> The average absolute efficiency value of all the known series exceeds that of the unknown by 10 per cent.

[1] Arps, G. F. "Work with Knowledge versus Work without Knowledge of Results." *Psychological Review*. XXIV: 449-455. Psychological Review Company, Princeton, N. J.

The average unit value of the known series of all sets of experiments shows a higher rate of work by 18 per cent over the corresponding value of the unknown series.

These conclusions are stated in technical terms that may not be comprehended by the average reader but the significance of the results is clear. It was found that keeping the subject informed of his progress caused him to work at a higher rate and with greater accuracy.

2. Wright[1] performed a similar experiment, employing in all eleven subjects. The work was done on Cattell's spring ergograph. The aim was to compare the amounts of work done by subjects working with different mental attitudes. At one time the subjects were told to work as long as they could and as hard as they could with no idea of securing any specified results; at another time they were urged to do a prescribed task as long as strength endured. In the first case the subjects were given no opportunity to watch the instrument or to keep track of their progress, whereas in the second case they were permitted to watch their strokes and requested to count them a part of the time. Each series of experiments continued for one half of a school year.

[1]Wright, W. R. "Some Effects of Incentives on Work and Fatigue." *Psychological Review.* XIII: 23, 24. Psychological Review Company, Princeton, N. J.

From the data obtained, Wright drew the following conclusions:

The subject accomplished more work when working under the mental stimulus of having a set task to be performed than he did when working without a definite aim.

A known impossibility to accomplish the required conditions tends to decrease the subject's total results.

The fatigue accompanying work is not so great when the subject is working under the direct stimulus of a definite aim, notwithstanding the fact he has at the same time produced an increase in his amount of work.

The percentage of gain, on an average, is approximately 25% in favor of working with a knowledge of results and with a definite aim.

3. Starch[1] reports the results of an experiment to determine the effect of the ready and accurate checking of the gains made in school subjects. In one elementary school the standard tests in reading, writing, spelling, and arithmetic were administered at monthly intervals and the pupils were kept informed of their scores. Apparently, this frequent and accurate checking of results facilitated to a surprising degree the progress made during the year, for the pupils gained on an average approximately twice as much as pupils do ordinarily in the same length of time. Of course, a part of this gain may

[1] From Starch, Daniel. *Educational Psychology*. p. 164. By permission of The Macmillan Company, publishers, New York.

be attributed to familiarity with the tests due to frequent repetition of the same or similar tests. Since there was no control group it is impossible to determine how much of the gain was due to this factor.

4. The writer had a class of forty-five first-year normal students perform the circle-drawing experiment to determine the effect of the ready and accurate checking of the results of the learner's efforts. Each student was given a model circle, 5 cm. in diameter, and the following instructions:

> With the model circle before you, draw free hand, as accurately as you can, with a pencil, thirty circles of the same size as the model. Do not lift the pencil from the paper until the circle is completed and do not make any corrections or erasures. Number these circles in the order in which they were drawn.
>
> Then draw another series of thirty circles in the same way and with the same care as the first thirty but, in this series, as soon as a circle is completed number it and measure the errors before going on to the next. To measure the errors draw four diameters, making equal angles, and measure the variation of each diameter from the true diameter. The total of these variations in millimeters is the number of errors for that circle. After completing the second thirty circles in this manner, go back and measure the errors in the first thirty and compare the rate of progress in the two series.

Progress in this type of work is very irregular,

either with or without knowledge of the errors, but the advantage is clearly in favor of the ready and accurate checking of results. For a summary of the results, see Table XVIII and Figure III.

TABLE XVIII SHOWING THE AVERAGE INITIAL SCORE, THE FINAL SCORE, AND THE GAIN IN EACH SERIES

	Initial Score	Final Score	Gross Gain	Percentage of Gain
Series I	12.9	12.4	.5	.04
Series II	10.9	6.4	4.5	41.27

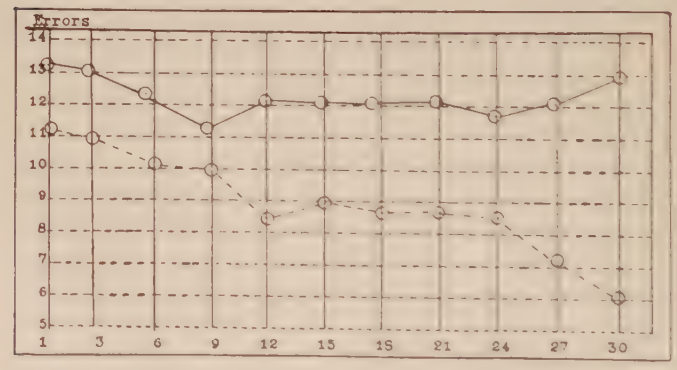

Figure III. Showing the decrease in errors in the circle-drawing experiment. The solid line represents Series I, without knowledge of errors, and the broken line Series II, with knowledge of errors.

The initial scores in Table XVIII were obtained by taking the average of the errors made in drawing the first five circles in each series and the final scores by taking the average errors of the last five circles in each series.

The advantage in this experiment is clearly in favor of the accurate checking of results. A knowledge of the nature and extent of the errors being made enabled the students to decrease considerably their errors in the second series, whereas in the first series they went on making about the same number of errors to the end of the series.

The foregoing data are too meager to warrant any sweeping conclusions; nevertheless, the few experiments that have been performed show a considerable advantage in favor of keeping the learner informed of his progress. To see oneself gaining stimulates to greater effort and leads to better concentration and to more zeal for the work. Then, too, a knowledge of one's errors enables one to select and exercise the precise bonds that make for rapid improvement.

V. Attitude of the Learner

Psychologists generally agree that the attitude of the learner is one of the most important factors affecting the rate and progress of learning but the effect of this factor, except in a few instances, has not been measured quantitatively.

1. The Active, Attentive, Problem-Solving Attitude

Peterson[1] performed an experiment designed to measure the influence of a determination to learn or the will to learn. His problem was: What difference will it make in later reproduction whether a person while reading a list of words knows or does not know that he will be asked to reproduce these words? The subjects were the students in two sections of a class in psychology, numbering twelve and twenty-nine, respectively. These students were of sophomore rank and were taking the second half of the general course in psychology.

When the class had assembled and had been provided with paper, the experimenter gave the following instructions:

> I am going to write on the board a list of twenty words which each of you will kindly copy on the left margin of your sheet as I write them. Let us do this as soon as possible so that we can use the words in an experiment.

The experimenter then read the list over once while each student checked his list to make sure that he had written all the words correctly. Immediately, the students were asked to fold their papers over so that the words could not be seen and write in

[1] Peterson, Joseph. "The Effect of Attitude on Immediate and Delayed Recall." *Journal of Educational Psychology*. VII: 523-532. Warwick and York, Inc., Baltimore, Md.

another column, *in any order*, all the words of this list that they could remember.

The experiment was then repeated with a new list of twenty words but this time the students knew that a reproduction would be called for; each student was encouraged to do his best by being told that he would be given his relative rank on the test. The details of the experiment were the same in both sections, with the exception that the words were given in the reverse order in Section II, thus overcoming in a measure any difference in the difficulty of reproducing the two lists.

Although no intimation was given that any further tests would be required, two days later the students were asked to write a second time all the words that they could remember of either list.

It was found that the students made better scores when they knew that a reproduction would be called for; that is, they did better with a determination to recall than they did without any such determination. In Section I immediate reproduction with determination to learn was 6%—25% better than reproduction without such determination, while delayed reproduction was 28%—73% better. In Section II the corresponding figures were 23%—37% better for immediate reproduction, and 38%—65% better for delayed reproduction. Thus the advantage was from 6% to 73% in favor of the *determination to learn*, or the *will to learn*.

In discussing these results Peterson says:

> The additional stimulus in our experiment that brought about the will to learn was the statement to the students before giving the active list of words that they would be asked to reproduce these words. This statement operating by association through various neural dispositions produced a much more definite response attitude than was possible in connection with the passive list, and thereby made possible certain definite associations.

Similarly, Book and Norvell[1] using college students as subjects, found that the "will to learn" produced higher scores in simple learning experiments. The stimulus sections made more improvement than the control groups.

Ruger[2] found that his subjects in reacting to puzzles assumed three characteristic attitudes: (1) the *self-attentive attitude*, in which there was an undertone of questioning as to whether the subject was not really inferior to other persons; (2) the *suggestible attitude*, in which he directed his attention to the experimenter, hoping to get some cue from him; and (3) the *problem-solving attitude*, in which the subject directed his attention to the problem in hand and to possible methods of solution.

Ruger found that the first and second attitudes hindered the progress of the subjects, whereas the

[1] Book, W. F., and Norvell, Lee. *Pedagogical Seminary*. XXIX: 305-362. 1922.

[2] Ruger, H. A. "The Psychology of Efficiency." *Archives of Psychology*. No. 26.

problem-solving attitude aided in the solution of the problems and was an important factor in the transfer of training to similar problems.

On the basis of considerable experimental evidence, Meumann[1] asserts:

> One of the most important results of our recent investigations of the process of learning is the discovery of the extraordinary influence which the different intentions or attitudes (Einstellungen) of the learner exert upon his whole memorial process and upon his memorial results. It may be shown that memorial results are determined in a highly differentiated fashion by the attitudes or intentions of learners.

Myers[2] comes to a similar conclusion from his experimental study of incidental memory. He says that we either shut out entirely from our senses the things that are not in accord with our interests and prejudices or we perceive them very imperfectly; that we see in people and things what we are looking for is the epitome of human experience.

Thus the experimental studies support the statement that an active, inquiring attitude of mind and the will to learn, with the attention directed to a specific problem or a phase of a situation, is favorable to rapid learning.

[1] Meumann, E. *The Psychology of Learning.* D. Appleton and Company, New York. 1913.

[2] Myers, G. C. "A Study of Incidental Memory." *Archives of Psychology.* No. 26.

2. Interest in Improvement

Doubtless, interest in improvement is an important factor affecting the rate of learning, although the potency of this factor has not been subjected to exact quantitative measurements. It is well known that practice may go on for days and even years with little or no improvement when one is not trying to improve. Most adults continue to write day after day without making any improvement in the quality of their handwriting simply because they are not interested in improvement. Likewise, many a pupil writes line after line in his copy book, making no improvement because he is not interested in improvement; he is not really trying to improve. Moreover, there is a considerable body of opinion to support the contention that interest in improvement is an important factor in the learning process. Bryan and Harter[1] emphasize this point in connection with their study of learning telegraphy. They write as follows:

> A fact which seems to be highly significant is that years of daily practice in receiving at ordinary rates will not bring a man to his maximum ability to receive. The proof of this fact is that men whose receiving curve has been on a level for years frequently rise to a far higher rate when forced to do so in order to secure and hold a position requiring the higher skill. That daily

[1] Bryan, W. L., and Harter, N. "Studies in the Physiology and Psychology of the Telegraphic Language." *Psychological Review*. IV: 50. Psychological Review Company, Princeton, N. J.

practice in receiving will not insure improvement is further seen in the fact that in many cases inferior operators after being tolerated for years are finally dropped because they do not get far enough above the dead line.

Likewise, Swift,[1] in his experiments dealing with the acquisition of skill, found monotony to be an important factor affecting the rate of learning. He writes:

In the experiment on ball tossing, on shorthand writing, and on typewriting monotony was found to be an important factor in the rapidity with which skill was acquired, and the same condition was observed in this work. Periods of monotony alternated with periods of pleasure in the work, at times of keen enthusiasm. While, as has been said, it is not probable that the depression associated with the monotony caused the plateaus, it seems quite reasonable that it prolonged them. Generally, though not always, this feeling of discouragement corresponded with the plateaus of the curve, and it is an interesting fact that returning pleasure and confidence sometimes prophesied a new advance.

In the same connection Book observes:

It seemed to be the strong desire to write with the utmost speed, strengthened in some cases by the thought of the value or worth of the experiment, that pushed the learners into these new and more economical ways of writing.

Other writers voice similar opinions which go to

[1]Swift, E. J. *Beginning a Language.* p. 309. 1906.

show that interest in improvement is an important factor affecting the rate of learning.

3. Freedom from Tension and Worry

It is probable that emotional states hinder the learning processes. It is well known that self-consciousness, or stage fright, seriously interferes with the performance of even a well-trained actor. If fear will paralyze recall, surely it would retard the selection and exercise of new bonds or the strengthening of the old bonds. Moreover, it has been observed that the best learners show the least emotional excitement in connection with learning activities. Pupils working under excitable teachers—often mistaken for enthusiastic teachers—usually make poor responses. They wave their hands wildly and otherwise make a great physical demonstration but they are very erratic in their responses and when they have an opportunity to speak frequently forget what they were going to say.

Furthermore, it is known that the function of an emotion is to prepare the organism for something more violent than learning. For example, the function of anger is to prepare the organism for a vigorous defense reaction—fighting. In other words when a man is angry he can wield a club viciously but he cannot handle a pen deftly. Likewise, other emotions prepare the organism for vigorous reaction rather than for skilled movements. With

reference to the emotions as a factor in learning, Thorndike[1] states:

> There is a conflict of theories and of practices with respect to the value of emotional fervor in learning. In the case of intellectual functions, the balance of opinion is that, apart from the eager, quiet zest for the work itself and for success in it, all emotional excitement is distracting—that not only violent love, grief, humiliation, and disgust, but also even moderate fear of onlookers, exultation at success, and anger at competitors or at oneself are to some extent wastes of energy and preventives of improvement.
>
> In the case of improvement in skill the balance turns again toward freedom from all the crude emotional states and even from all the finer excitements, save the intrinsic satisfyingness of success and the firm repudiation of errors which can hardly be called exciting.

All emotional states and, therefore, even the milder forms of excitement retard the learning processes. In the interest of rapid learning the teacher should avoid excitement and cultivate a quiet zest for work.

Again, worry distracts attention, making concentration on the work in hand next to impossible. Worry occurs when there is a mental conflict or when there is doubt about the successful outcome of some important event. The proportion of illnesses is usually higher when mid-term and final

[1]Thorndike, E. L. *Educational Psychology.* Vol. II. pp. 226, 227. Teachers College, Columbia University.

examinations are being held. Worry may be assigned as the cause. Probably the illness is a compromise between the pupil's desire to stand well in the class and his desire to avoid an event the outcome of which is in doubt. Apparently, worry distracts attention and consumes energy, thus very materially slowing down the learning processes.

Summarizing the section, we may say that the attitude of the learner is one of the most important factors affecting the rate of learning. The active, attentive, problem-solving attitude makes for rapid learning, whereas excitement and worry waste energy and hinder improvement. "Practice makes perfect" only in cases of strong interest in improvement.

VI. Summary

The important factors affecting the rate and progress of simple associative learning are:

1. Motivation. Motivation is the drive that carries forward an activity. The chief sources of motivation are the instincts and capacities. The teacher should rely mainly on these sources, although external incentives may be used to advantage when intrinsic motives are weak.

2. The selection of the right responses. In cases of new motor adjustments the selection of the right responses is a difficult problem. The method of selection is commonly known as "trial and error" and is charac-

terized by many random and apparently useless movements. Progress is made through the gradual elimination of these random movements and the selection and exercise of the right responses. The factors concerned in selection are: (1) the set of the organism, (2) the satisfyingness of the response, and (3) the fitness of the response for the purpose in view.

3. *The length and distribution of practice periods.* The experimental data bearing on the length and distribution of practice periods indicate that (1) relatively short periods coming once or twice daily are better than longer periods coming less frequently, (2) a reducing time schedule is better than an equal time schedule, and (3) spaced repetitions are more effective than unspaced repetitions.

4. *A knowledge of results.* A knowledge of the results being obtained stimulates to greater effort and leads to better concentration and more zeal for the work. Also, a knowledge of the nature and extent of the errors being made enables the learner to select and exercise the precise bonds that make for rapid improvement.

5. *The attitude of the learner.* There is a considerable body of data to show that the attitude of the learner is an important factor influencing the rate of learning. The active, attentive attitude and interest in improvement make for rapid learning, whereas excitement and worry hinder the learning processes.

CLASS EXERCISES

1. Make a list of the chief factors affecting the rate and progress of learning.

2. Write out a clear and definite statement of the meaning of motivation.

3. Are the instincts and capacities the only sources of motivation? Cite the evidence which justifies your conclusions.

4. Is the use of external incentives justifiable? Make a brief of the arguments for and against their use.

5. Could the teacher by intelligent direction eliminate random movements when the pupil is making new motor adjustments? Cite evidence for your conclusion.

6. How are the right responses selected? Review and criticize the statements by Thorndike, Book, and Peterson.

7. What is the most advantageous length of practice periods for handwriting or typewriting and the most advantageous distribution of these? Cite the evidence which justifies your conclusions.

8. Present the evidence to show that knowledge of results facilitates learning.

9. Make a list of the different attitudes a learner may assume. Which of these facilitate learning? Which retard learning? Why?

10. Criticize the statement "Practice makes perfect."

REFERENCES FOR CLASS USE

1. Book, W. F. *Learning to Typewrite*. Part I. New York: Gregg Publishing Company. 1925. (A good discussion of the laws of learning as they apply to the acquisition of skill.)

2. Burton, W. H. *Supervision and the Improvement of Teaching*. Chaps. IV and VII. New York: D. Appleton and Company. 1923.

(Discusses the general principles of learning and the principles underlying drill. Gives observation outlines.)

3. Mead, A. R. *Learning and Teaching.* Chap. VI. Philadelphia: J. B. Lippincott Company. 1923.
(A good brief discussion of several of the factors underlying the acquisition of skill.)

4. Myers, G. C. *The Learner and His Attitudes.* New York: Benj. H. Sanborn Company. 1925.
(An extended discussion of the pupil's attitude as a factor in learning. A good book for the teacher to read.)

5. Pyle, W. H. *The Psychology of Learning.* Chaps. IV and V. Baltimore: Warwick and York, Inc. 1921.
(Chapter IV discusses the general factors of economical learning; chapter V, the special factors. Based upon the experimental work in the field of learning.

6. Starch, Daniel. *Educational Psychology.* Chap. XI. New York: The Macmillan Company. 1919.
(A good summarizing discussion of the factors of simple associative learning.)

7. Sullivan, Elizabeth. "Mood in Relation to Performance." *Archives of Psychology.* No. LIII. New York.
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(A good analysis of the laws of associative learning.)

9. WILSON, H. B., AND WILSON, G. M. *The Motivation of School Work*. Chaps. II, III, and IV. New York: Houghton Mifflin Company. 1916.
(A good discussion of the meaning, psychological bases, and sources of motivation.)

10. WILSON, W. R. "Principles of Selection in Trial and Error Learning." *Psychological Review*. XXXI: 150-160. 1924.
(A critical discussion of the factors of selection. Offers conditioned responses as an explanation.)

Note. The student should also use the footnote references most of which are not repeated in this list.

CHAPTER VI

SUPERVISING SIMPLE ASSOCIATIVE LEARNING

QUESTIONS TO BE KEPT IN MIND WHEN READING

1. What are the main factors affecting the rate and progress of simple associative learning?
2. How can the teacher provide for these factors in supervising the study of a class?
3. What subjects, and parts of subjects, involve the simple associative type of learning?

To supervise study effectively the teacher must meet two conditions: (1) she must have an accurate and extensive knowledge of the important factors involved in the type of learning she is supervising, and (2) she must know how to provide for these factors in directing the study of a class. In the preceding chapter an attempt was made to outline the factors of simple associative learning, thus enabling the teacher to meet the first condition. How the teacher can make adequate provision for these factors is the main problem of the present chapter. *How can the teacher provide for the essential factors of simple associative learning?* Each factor of this type of learning as set forth in the preceding chapter will be considered in turn.

I. Motivation

How can the teacher provide for the motivation of simple associative learning? In general the teacher can utilize the fundamental sources of motivation: the instincts and capacities, supplementing these through the use of external incentives. More specifically, as follows:

1. *The teacher can connect the work of the school with the pupil's native tendencies.* She can appeal to play, to competition, to love of approbation, or to some other native tendency or group of tendencies. For example, as Lida B. McMurry[1] has shown, reading lessons can be connected readily with plays and games. To illustrate, the pupil may be taught to play the "Simon Says" game orally until he knows the game and enjoys playing it. At this stage the words *in*, *out*, *up*, *down*, and *wiggle-waggle* may be printed on the blackboard while the other parts are given orally. The desire to play the game well motivates the reading of the printed words. Mrs. McMurry gives abundant illustrations of how to use the instinctive tendencies, although the range of instincts appealed to is narrow. Similarly, the work in handwriting, spelling, and the fundamentals of arithmetic may be connected with the pupil's native tendencies, thus providing motivation in these subjects.

[1] McMurry, Lida B. *Methods of Teaching Primary Reading.* The Macmillan Company, New York. 1916.

2. *The teacher can adjust the work to the native capacity and previous training of the pupil.* In this connection it should be recalled that the mechanisms constituting a capacity have inherent in them their own driving power. One readily becomes absorbed in work for which he has large capacity. A pupil does not need to be a genius, however, to enter heartily into his work. All that is demanded is that the work be on the level of the pupil's capacity. Although his absorption in the work is not so great as that of the genius the pupil enjoys engaging in activity that challenges his highest powers but is easy enough to permit him to overcome the difficulties it presents and experience the feeling of mastery. On the other hand insurmountable difficulties are annoying. Continual failure paralyzes effort. Driving power cannot be obtained from a regimen of failure. Too often pupils are expected to read material, to spell words, to perform operations in arithmetic that are far beyond their capacities. Listless activity ensues. The remedy is not far to seek: adjust the work to the capacity of the pupils. Do not hesitate to give the fourth-grade pupil a primer for his reading book if his reading ability is on the primer level. Assign words and fundamental operations that are so simple that the pupil can overcome the difficulties to the extent of experiencing the feeling of mastery.

Further adjustments to the pupil's capacity may be made by dividing a grade into three groups, known as A, B, and C, according to the ability of the pupils to do work, group B denoting the average, A the superior, and C the inferior, or slow, group. Then require of each group work commensurate with its ability. If it is not feasible to divide a grade into the three groups as suggested some adjustment may be made through the use of differentiated assignments: minimum, average, and maximum. Under this plan each pupil is encouraged to complete as much of the assignment as he can, the minimum being made easy enough for the slow pupil while the maximum is made difficult enough to tax the powers of the superior pupils.

The same end may be attained in certain subjects through the use of supervisory material that provides for individual differences. For example, the Courtis Standard Practice Tests in Arithmetic and the Studebaker Economy Practice Exercises provide for individual differences in both the quantity and quality of the work given the pupil to accomplish. A proper use of these materials would insure stronger motivation of the drill work in the fundamental operations of arithmetic.

3. *The teacher can lead the pupil to set up definite standards to be attained in the various subjects.* Through the use of the standard tests it is now possi-

ble to set up definite objective standards of attainment in all the subjects involving primarily the simple associative type of learning.

There are now several scales that may be used to rate the handwriting of pupils. Any of these scales may be used. Take, for example, the Ayres Scale, Gettysburg Edition. The teacher can rate the pupil's handwriting on this scale at the beginning of the year and inform him of his standing. Then she can explain to the child that the standard of improvement, in quality, on this scale is four points in one school year and lead him to set up as a definite goal to be attained by the end of the year a gain of at least four points. Under favorable conditions six or more points could be attained by many pupils. For example, if a pupil scores 50 points at the beginning of the year, he would set up as his goal for the year's work the attainment of 54 or more points. Thus every child would have a definite goal to be attained by the end of the year.

In spelling definite standards may be derived from the standard tests. Any standard test may be used for this purpose. The initial tests should be given near the beginning of the year and each pupil informed of his standing. Then a definite amount of improvement should be agreed upon as a reasonable goal for the year's work. In case the teacher is using the Starch and Mirick *Test and*

Study Speller, the tests should be made up of words selected from the text as directed by the authors. In addition to the yearly standard a daily standard for each pupil may easily be established, such as 60% accuracy, 90% accuracy, or 100% accuracy in the daily work.

In arithmetic definite standards in the fundamental operations are easily obtained from the standard tests, such as the Courtis Tests, Series B. The teacher may rate the class on the test at the beginning of the year, then lead each pupil to adopt as his goal a definite amount of improvement in both speed and accuracy.

Definite goals may be established in formal English and in some high school subjects, as, for example, stenography and typewriting.

Definite, attainable goals undoubtedly furnish some motivation. They stimulate to greater activity, providing the pupil something definite to be attained and spurring him on to reach the goal.

4. *The teacher can employ external incentives.* The better class of external incentives, such as Chapman and Feder employed in their experiment, are but indirect appeals to native tendencies. These make their appeal to some basic instinctive interest or to some acquired interest. The term *incentive* has a wide and varied meaning, including marks, desire for promotion, prizes, honor rolls,

holiday programs, school exhibits, and many other devices for stimulating pupil activity. Whenever the more fundamental sources of motivation fail or need reinforcement, the teacher should have recourse to these incentives. Care should be taken, however, to make the appeal to the whole group or to as many pupils as possible. For example, give rewards to the upper 50% instead of to the pupil standing highest. Also give prizes or honors for improvement rather than for absolute scores.

II. Selection of Right Responses

There is no agency devoted exclusively to selection. There is therefore no direct means of controlling the selection of the right responses. The teacher's opportunity, however, lies in the fact that any tendency or interest is, in part, a selective agency. The problem for consideration here is what the teacher can do to aid the pupil in selecting the right responses in any learning situation.

1. *When the learning involves no new motor adjustments the teacher can tell or show the pupil which is the right response.* For example, if the stimulus is *seven times nine*, the teacher may tell the pupil that the right response is *sixty-three* or refer him to a table of number combinations from which he can read the right response. Likewise, the correct spelling or pronunciation of a word may be determined in this direct way. Similarly, all responses

involving no new motor adjustments may be selected without waste of time and energy.

2. *When new motor adjustments are involved the teacher can aid selection through the control of the following factors:*

1) Motivation. Each drive is not only a general stimulus to activity but also, in part, a special selective agency. The cat in the puzzle box reacts to specific parts of the box because it is trying to get out. Any act consistent with this end is selected and repeated, while the useless acts are eliminated. Moreover, a strong drive leads to vigorous and multiple reactions, thus giving the selective factors a chance to be operative. It has been found that new and more advantageous ways of reacting are usually discovered when the individual is working under high pressure. The teacher can exercise some control, therefore, over the selective agencies through motivation or through stimulating drives toward definite goals.

2) The set of the organism. A definite set, or specific aim, causes the pupil to be attentive to the relevant stimuli and to neglect the irrelevant. Thus a specific aim acts as a selective agency. Therefore, the practical question arises: How can the teacher provide for definite aims? The following suggestions are offered as a partial solution to this problem.

In handwriting the teacher can rate the pupils on the Freeman Scale or Gray's Score Card and direct attention to the essential phases of good handwriting, such as uniformity of slant and alignment, quality of line, spacing, letter formation, and speed. Then she can make these qualities specific aims for the daily practice in handwriting; e. g., uniformity of slant may be made the specific aim for a series of lessons. Similarly, uniformity of alignment, letter formation, quality of line, spacing, and speed may, in turn, be made specific aims for other series of lessons. Thus pupils may be led to analyze their own writing habits and direct their attention to the specific points where improvement is needed; this will facilitate the selection of the right responses.

In arithmetic specific aims may be set up through the use of the special material prepared for the purpose of providing effective drill in the fundamental operations. The Courtis Standard Practice Tests, for grades 4 to 8, furnish a series of cards with definite time limits for each grade. By using these cards the teacher is enabled to provide definite aims for each day's practice. The specific aim of the pupil is to be able to do the exercises on his card with 100% accuracy in the allotted time, which varies with the different grades from three minutes in the eighth grade to six and one-fourth minutes in the fourth grade. The same ends may be at-

tained through the use of the Studebaker material. Again, diagnostic tests may be administered that will reveal the defects in the pupil's work. Then a series of remedial lessons, designed to overcome these defects, may be planned, each defect providing a specific aim for a lesson or series of lessons.

Language defects may be definitely located through the application of the diagnostic tests and the personal observation of the pupil's language habits. Then the overcoming of these errors may constitute the specific aims for a series of language lessons.

3) Satisfaction. According to Thorndike, resultant satisfaction facilitates the selection of the right responses. Whatever a teacher therefore can do to increase the satisfaction that a pupil derives from his correct responses will aid selection. To this end the teacher should give due recognition to honest effort and worthy achievement. Judicious praise is effective and, in some cases, prizes and honors may be awarded. Moreover, ready and accurate checking up on a pupil's work adds to the satisfaction of worthy effort and achievement. Again, success brings satisfaction, while failure is annoying. Consequently, adjusting the difficulty of the pupil's work to the level of his capacity makes his work more satisfying.

Briefly, then, the teacher can aid selection by

telling the pupil or demonstrating to him the right response to a situation, by providing for strong motivation, by determining the set of the organism through specific aims, and by adding to the satisfyingness of the pupil's right responses.

III. Length and Distribution of Practice Periods

There are no fixed and reliable standards by which the teacher can determine the proper time to be allotted each subject in the curriculum. Perhaps the best guide is the consensus of opinion of the leading school administrators. The time allotted to any subject, however, varies widely in different school systems. The average of several cities is therefore a better guide than the practice in any one school system. Fortunately, data of this type are available. Henry W. Holmes[1] made a study of the time allotment of each of the elementary subjects in fifty representative cities of the United States. The results of this investigation are summarized in Table XIX.[2] (See page 220.)

To determine the approximate time allotment for any subject the teacher would refer to this table and not the average time allotment of these fifty

[1] Holmes, H. W. "Time Distribution by Subjects and Grades in Representative Cities." *The Fourteenth Yearbook of the National Society for the Study of Education*. Part I, pp. 21-27. 1915.

[2] The Table is found also in Strayer and Engelhardt. *The Classroom Teacher*. p. 215.

cities to this subject. For example, how much time should be given to spelling in the sixth grade? According to Table XIX, 90 minutes a week should be devoted to spelling in the sixth grade. Similarly, the time allotment for any subject in any grade may be determined. Of course, these standards

TABLE XIX. SHOWING DISTRIBUTION OF TIME BY SUBJECTS AND BY GRADES IN FIFTY CITIES

Minutes per Week devoted to:	GRADES							
	I	II	III	IV	V	VI	VII	VIII
Opening Ex.	59	59	59	54	49	48	48	48
Reading	412	364	291	237	195	181	151	150
Language	116	122	145	164	179	182	207	220
Spelling	83	102	113	103	94	90	81	79
Penmanship	77	93	81	82	77	73	60	57
Arithmetic	93	149	203	231	223	226	217	220
Geography	25	11	77	128	157	166	151	118
History	42	48	54	88	103	110	141	181
Science	57	63	62	57	53	62	70	88
Drawing	151	84	87	82	77	77	77	76
Music	70	130	73	74	70	70	70	76
Manual Tr.	65	73	62	70	77	88	112	115
Physical Tr.	71	63	62	62	59	62	59	60
Recess	135	128	128	119	113	108	102	102
Miscellaneous	118	98	135	119	122	122	105	135

should be regarded merely as tentative and suggestive, for local conditions must receive due con-

sideration. The teacher should modify these time allotments to meet the needs of her class and the exigencies of her daily program. For example, more than the allotted time should be devoted to arithmetic in some grades because the pupils are below standard in this subject, while less than the allotted time may be devoted to another subject for the reason that the pupils are already well up in that subject. Then, too, local conditions may justify the devoting of more than the usual amount of time to certain subjects or groups of subjects; for instance, manual training in an industrial center, or agriculture—not listed in the table—in a farming section.

The distribution of the time allotted to each subject is, however, under the immediate and direct control of the teacher, acting under the advice and direction of the supervisor. How should the weekly time allowance for any subject be distributed? If 60 minutes a week is allotted to handwriting how should this time be distributed? Several distributions are possible: (1) 60 minutes all at one time; (2) 30 minutes twice a week; (3) 20 minutes three times a week on alternate days; (4) 12 minutes daily; or (5) 6 minutes twice a day. Likewise the time allotted to other subjects may be distributed in various ways. In the case of handwriting which distribution would be most favorable to rapid learning? Unfortunately, the data now available do not

enable us to give a final and definite answer to this question, although we are reasonably sure that relatively short periods coming once or twice a day will give better results than longer periods coming less frequently. Doubtless, 12 minutes daily would be a very satisfactory distribution for the upper grades, whereas 6 minutes twice a day would probably be better in the lower grades. Of course, the older pupils can work profitably for longer periods.

Similarly, the teacher should consider the allotment and distribution of time to each of the subjects involving the simple associative type of learning and arrange the most advantageous length and distribution of practice periods.

IV. A Knowledge of Results

How can the teacher provide for this factor? She can check up on the pupil's work and keep him informed of his progress. Frequently, pupils attend school a whole year without knowing at any time how they are progressing, except as their standing is indicated on the monthly report card, which is usually a very unreliable measure of progress. Sometimes the pupil's only criterion of progress is the attitude of the teacher. On his being asked how he is getting on at school, he will reply, "Fine, I guess; I haven't had any trouble with the teacher." Obviously, this uncertainty as to the results of his efforts is very unfavorable to rapid progress. Re-

sults must be checked more accurately. But how can accurate checking be accomplished?

In handwriting the results may be checked frequently by rating the pupils on the standard scales. At the beginning of the year it would be a good plan to rate the pupils on some scale measuring the general merits of handwriting, such as the Ayres or Thorndike and, on the basis of this rating, set up definite standards for both speed and quality to be attained by the end of the year. Then a diagnostic scale, as the Freeman or some other, may be used to check up on the progress from month to month. The Freeman Scale is well adapted to this use for, being a diagnostic scale, it centers attention on the essential phases of handwriting. To make this plan effective, each pupil's monthly scores should be recorded on an individual record card, to which he can refer at will. For this purpose a record card, adapted from Monroe's[1] *Measuring the Results of Teaching* (Figure IV) is recommended. This card was used in the handwriting experiment reported later in this chapter and contains the record of one pupil participating in the experiment. The value of these records may be still further enhanced by representing graphically the pupil's progress from month to month. This may be done by plotting a learning curve based upon the monthly

[1] Monroe, W. S. *Measuring the Results of Teaching.* Chaps. IV and V. Used by permission of, and arrangement with, Houghton Mifflin Company, the authorized publishers, New York.

NAME B. B. GRADE

MONTH	1	2	3	4	5	6	7	8	9	GAIN
Uniformity of slant			1.6	3.0	2.8	2.8	2.8	2.8		1.2
Uniformity of alignment			2 6	2 8	2.8	2.8	3.0	3.0		.4
Quality of line			1.4	2.0	2.0	2.0	2.0	2.0		.6
Letter formation			4.3	5.2	4.8	4.8	5 2	5.8		1.5
Spacing			2.6	2 5	2.5	2.2	2.5	2.8		.2
Total Freeman			12.5	15.5	14.9	14.6	15.5	16.4		3.9
Freeman Standards	20 0								21.0	1.0
Speed			50 0					80.0		30.0
Standard	65 0								80.0	15 0
Ayres Quality			41 2					53.8		12.2
Ayres Standard	50 0								54 0	4.0

Figure IV. Individual record card of one pupil participating in the handwriting experiment, continuing 6 months, 3 to 8, inclusive.

scores, as in Figure V, which represents the record of one pupil for a period of six months.

In the interest of greater accuracy the papers should be rated by three teachers at least and the average rating taken as the true score. In addition to these ratings by the teachers, the scales should be made accessible to the pupils and they should be encouraged to rate themselves frequently.

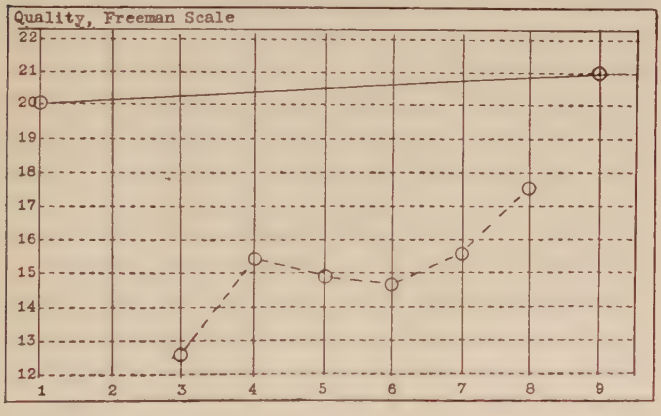

Figure V. Showing the individual record of one pupil in the handwriting experiment. The solid line, standard; the broken line, pupil's record.

A similar table and graph may be made, showing the progress of the class as a whole.

Again, the Courtis Standard Practice Tests in Handwriting provide a system for checking up on the pupil's daily work. These tests can be used to

advantage in the daily practice in handwriting. The material consists of a teachers' manual, a daily lesson book for the pupil, a daily record card and graph blank, and class record sheets. The application of this material begins with a research test to determine the initial standing of each pupil. Then all the pupils that are up to standard on this initial test are excused from drill on the practice exercises, whereas those who fail to reach the standard begin with the first practice exercise and work on each exercise in the series in turn until they are able to attain the standard. As soon as a pupil has attained the standard on one exercise he is permitted to go on with the next. He is taught to rate his daily work and keep a record of his progress, thus providing for the factor, knowledge of results. At the end of the semester another research test is given to measure the progress for the term. This material is very helpful to the teacher not only in providing for the ready and accurate checking of results but also in providing for other factors affecting the rate and progress of learning.

The results of spelling are not difficult to check with a fair degree of accuracy. For the purpose of the frequent checking of results, all words may be considered of equal difficulty and the score recorded in terms of the percentage correct. Each pupil should keep a record of his own daily scores and of the class scores. The daily scores should be aver-

aged for a weekly score and the weekly scores averaged for a monthly score. The results should be represented graphically, as in Figure VI. This graph is based upon the monthly scores. Similar graphs may be made for weekly and even daily scores. The pupil should be taught how to graph his own record as well as the record of the class and to compare his record with the class records.

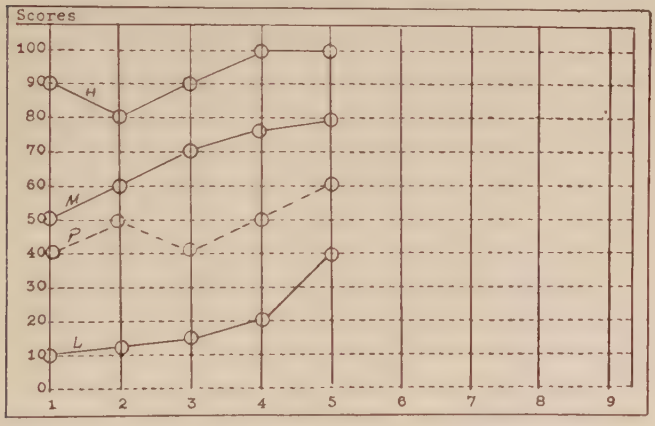

Figure VI. Showing the record of one class for 5 months. The solid lines represent the class scores—highest, median, and lowest; the broken line, the record of one pupil.

In addition to the daily scores and graphs the standard tests should be used occasionally to check the progress of the class. The standard test should be given at the beginning and at the end of the

school year to measure the progress of the class for the year. Recently, Starch and Mirick published *A Test and Study Speller*, which provides not only a list of well-selected words for each grade but also a system of frequent checking of the results of the pupil's efforts. The 360 words allotted to each grade (except the first) have been divided into 6 groups of 60 words each and standardized by giving them to approximately 7000 pupils in fifteen cities. If a teacher wishes to check up on her class she can devise a standard test by turning to the list of words for her grade, beginning with any one of the first six words and picking out every sixth word in the list. Thus six standard tests may be given to the class in one school year. Moreover, the pupils are tested on the very words that they are expected to learn during the school year. Consequently, these tests are direct measures of the pupil's progress. A graph, based upon the scores in these tests, may be plotted as drawn in Figure VI.

Likewise, the *Horn-Ashbaugh Speller* provides a system of checking for each lesson or word list. By means of the standard errors, which are given for each lesson, the pupils may compare their scores with those of other grades and with the country at large. Thus an effective system of daily checking is provided.

Similarly, the results may be checked in arith-

metic, language, and other subjects. For the frequent checking of results it is advisable to use a scale having more than one form or set of exercises. The Standard Practice Tests in the various subjects make ample provision for the ready and accurate checking of the progress of the class.

V. Attitude of the Learner

The attitude of the learner is one of the essential factors in a learning situation. The pupil must be active, attentive, interested in improvement, and have the will or determination to learn. How, then, can these attitudes be determined or controlled? Not by any show of authority or exercise of force. To command a pupil to have the determination to learn or to become interested in improvement would be futile. Attitudes must be controlled indirectly through providing for the factors that have been discussed in the previous sections of this chapter. Then, too, the teacher must assume the right attitude toward her work and toward the children. If a pupil dislikes the teacher of a certain subject this dislike will react unfavorably on his attitude toward the subject. Similarly, inadvisable and unjust disciplinary measures may cause a pupil to assume an unfavorable attitude toward his work. Moreover, threats of failure, continual nagging, etc., tend to create tension and worry, thus developing attitudes unfavorable to rapid learning.

Briefly, then, the teacher can control the attitudes of her pupils: (1) by providing for the other factors that influence learning, (2) by assuming the right attitude toward her own work, (3) through the wise administration of discipline, and (4) by cultivating a quiet zest for the work, thus avoiding tension and worry.

Summary of section. What can the teacher do to help the pupil to learn more economically?

1. The teacher can provide for motivation in the following ways:
   1) By utilizing the pupil's native tendencies.
   2) By adjusting the work to his native capacity and previous training.
   3) By leading the pupil to set up definite goals to be attained in a given time.
   4) By employing external incentives.

2. The teacher can aid in the selection of the right responses:
   1) By telling or showing the pupil which is the right response when no new motor adjustments are necessary.
   2) By controlling the following factors: motivation, the set of the organism as determined by specific aims, and the satisfaction obtained from the correct responses.

3. The teacher can arrange the most advantageous length and distribution of practice periods.

4. The teacher can check up frequently on the results being obtained and keep each pupil informed of his progress.

5. The teacher can control in large measure the attitude of the pupils by providing for the other factors that affect the rate and progress of learning and by assuming the right attitude toward the work and toward the pupils.

VI. Simple Associative Learning and the School Subjects

In the following pages an attempt is made to indicate the school subjects and the parts of subjects involving primarily the drill or habit-forming type of classroom activity designated *simple associative learning*. Specific suggestions are given to show how the factors of this type of study may be applied in the supervision of the study of the various school subjects. It is hoped that these suggestions will be a distinct aid to the teacher in her efforts to provide for the factors of simple associative learning.

1. Handwriting

Learning to write is purely simple associative learning requiring new motor adjustments. The writing movement is very complex, requiring the coördination of several groups of muscles. In the beginning the nervous impulses flow over into many useless channels. The child writes with his whole body; the entire organism is on a strain. The selection of the right responses is a slow and laborious

process which proceeds largely on the "trial and error" basis. The adult cannot appreciate the difficulties that a child encounters in initiating the process of learning to write unless he has performed the mirror-drawing experiment or has attempted to write while holding the pencil with his toes. Consequently, effective supervision is urgently needed. Effective supervision cannot eliminate the "trial and error" process but it can reduce the errors to a minimum. For a demonstration of the supervision of handwriting see chapter XIII, experiment 2. The instructions to the teachers conducting this experiment show how to provide for the essential factors in learning to write. Only a few additional suggestions will be given in this connection.

1. The best way to learn to write is to practice writing rather than to write exercises. There is considerable loss in the transfer of training from "push-pull" and oval exercises to actual writing. Have the pupils practice writing words and sentences.

2. Waste no time on aimless writing. See that every practice period has a specific aim. The pupil will not progress much unless he is trying to improve some specific phase of his handwriting; e. g., the formation of certain letters, spacing, or the uniformity of alignment.

3. Teach the pupil to note his own errors and to strive to overcome them. Gray's Score Card can be used to advantage for this purpose.

4. Standards of achievement should be determined by the demands of life outside of school. A score of 60 or 65 on the Ayres scale is usually considered satisfactory. Pupils may be excused from handwriting when they have reached this standard.

5. At least twice a year progress should be measured on some standard scale. A good plan is to check up on the progress of the pupils once a month with Freeman's Diagnostic Scale and to check at the beginning and end of the year with some scale measuring general merit; e. g., the Ayres or Thorndike scale.

For more specific suggestions on the teaching of handwriting see the following references:

Freeman, F. N. "The Handwriting Movement," *Supplementary Educational Monographs.* No. 9.

———*The Teaching of Handwriting.*

———*The Psychology of the Common Branches.* Chap. II.

Freeman and Dougherty. *The Teaching of Handwriting.*

Hall-Quest, A. L. *Supervised Study in the Elementary School.* Chap X.

Monroe, W. S. *Measuring the Results of Teaching.* Chap. VIII.

Taylor, Joseph S. *Supervision and Teaching of Handwriting.*

2 Spelling

Spelling as a school subject lies wholly within the field of simple associative learning. Learning to spell is a process of forming a series of simple

connections representing meaning, pronunciation, and the order of the letters making up the word. In recent years many investigations have been made to determine the proper words to be taught in the elementary school and the most economic methods of learning to spell these words. An interpretation and evaluation of these studies would seem to justify the following suggestions:

1. Two new words a day throughout the elementary school period will give the child a vocabulary sufficient for all ordinary purposes.
2. Test all word lists before teaching; that is, test the pupils on each word list when the words are assigned for study.
3. The drill method is more effective than the incidental method; hence provide for several repetitions of each word to be learned during the year.
4. Spelling rules have but little value; few, if any, should be taught.
5. Correct pronunciation and syllabication are distinct aids in learning to spell. Divide difficult words into syllables and pronounce them distinctly. Call special attention to any syllables that are likely to cause trouble.
6. Supervised study is more effective than unsupervised study. Consequently, it is better to provide for study under the immediate direction of the teacher.
7. Check up frequently on the pupil's progress and keep him informed of his scores. Devise a system of daily checking and graph the results.
8. Arrange daily periods for study and practice.

Ten to fifteen minutes should be long enough for the recitation period. A short study period should be provided.

The following plan for teaching spelling provides for the foregoing factors and has proved to be very effective.

Plan for Supervised Study in Spelling

1. Teach two new words a day and provide for the repetition of at least three that have been taught in earlier lessons. Easy words need not be repeated but the difficult ones should be repeated several times.

2. On Monday test the class on the list of words to be studied during the week. Group these so that each group will contain two new words and at least three review words.

3. Assign one of these groups for study each day. Teach the pupils to spend the major part of their time on the words they missed in the preliminary test. This exercise will aid them in identifying the connections that need to be strengthened by practice.

4. Teach the pupils the most economic method of procedure in studying difficult words:

1) Teach them to pronounce the words correctly and distinctly. In the lower grades the pronunciation must be learned by imitating the teacher but in the upper grades the pupils should be taught how to use the dictionary for this purpose.

2) Teach them to divide the word into syllables, noting particularly the part of the word that caused trouble in the assignment test.

3) Teach them to look at the word closely and then write it without looking at it again. Check with the correct form and repeat the process until the word can be written correctly two or three times in succession.

5. Teach the meaning and use of the new words each day. Have the pupils write the words in sentences. The older pupils should use the dictionary in studying the meaning and use of words.

6. Finally, pronounce the words and have the pupils write them in their spelling blanks.

7. Grade these blanks and return them to the pupil not later than the next class period. Plot a graph showing the attainment of the class. Have each pupil keep a graph showing his own scores in comparison with the class scores: the highest, lowest, and median scores.

8. Provide for group competition and encourage each pupil to compete with his former records.

9. Lead each pupil to set up definite standards of attainment, such as perfect score, 90%; for very poor spellers the standard may be lower, as for example, 60%. But as soon as a pupil is able to reach a low standard he should set for himself a higher standard until he is able to make a perfect score.

For more detailed discussions of how to supervise the study of spelling the teacher is referred to the following texts:

Hall-Quest, A. L. *Supervised Study in the Elementary School.* Chap. IX.

Pryor and Pitman. *A Guide to the Teaching of Spelling.*

Starch and Mirick. *A Test and Study Speller.*
Horn-Ashbaugh Speller.
Monroe, W. S. *Measuring the Results of Teaching.* Chap. 7.
The McCall Speller.

3. Reading

Reading is primarily a process of assimilative thinking but learning to read, that is, mastering the mechanics of reading, is to a considerable extent simple associative learning or habit forming. Practically all authorities on the teaching of reading would agree that the following phases of learning to read are important and that they require drill to insure satisfactory progress:

1. The acquisition of a new set of eye movements
2. Word recognition
3. Phonetics or word analysis

Supervision, then, must provide for drill on these factors. But how should this drill be given? Each factor will be considered in turn.

1. The eye movement. Scientific investigations in this field justify the following statements:

1) The eye moves across the page from left to right in a series of quick movements and short pauses or fixations, returning to the left of the page with unbroken sweep.

2) Periods of fixation consume almost all the reading time. The interfixation movements require only from one thirteenth to one twenty-fourth of the total reading time.

3) Speed of reading may be increased by decreasing the number and duration of these pauses.

4) Good readers have a wider eye-voice span than poor readers. By eye-voice span is meant the distance the eye runs ahead of the voice in reading. Increasing the eye-voice span makes for more rapid reading.

5) The investigations of Gray, Dearborn, Huey, Judd, O'Brien, and others show that rapid readers have acquired rhythmical eye movements. Gray states that these rhythmical movements of the eyes are a prerequisite to rapid silent reading.

How, then, can these regular and rapid eye movements be acquired? Not by directing attention to these movements and consciously trying to make fewer fixations. The habits themselves are modified through drill on the factors that control these eye movements. First, it should be noted that the total reading time is practically equal to the number of fixations multiplied by their average duration. To increase the rate of reading, therefore, the number of pauses must be decreased or the average duration be shortened, or both. But the number of pauses is determined by the perceptual span. Consequently, training must be given to increase the pupil's perceptual span. He must be trained to see more at a glance and to

perceive more quickly. To this end proceed as follows.

Lead the pupil to see the advantages of rapid silent reading. Motivate the drill exercises through the use of games and through competition with other pupils and with the pupil's own previous score. Similarly, other native tendencies may be utilized to stimulate him to put forth his best efforts.

Drill the pupils in reading at a glance cards containing words, phrases, and whole sentences. Begin these exercises with easy material requiring only a short perceptual span. Keep the time exposure constant and gradually increase the length of the material. Then keep the material constant and decrease the time exposure.

The material used in these drills should be printed on cards, commonly called flash cards. The teacher may print her own material or she can obtain the printed cards from the company publishing the school reader she is using. Most companies now provide flash cards to be used with their readers.

These drill periods should be regular and systematic. Five minutes daily devoted to this type of drill would be adequate. Drill should be discontinued when satisfactory results have been achieved.

Toward the end of the drill period have the pupils reproduce in writing the material of the last two or three exposures. Give each pupil a definite score based upon the percentage of words reproduced correctly. Have him keep a record chart. Make a graph showing the progress of the class and have each pupil make a graph showing his own progress.

Follow the preceding type of drill with rapid silent reading from the school reader or a supplementary text. These suggestions will be found useful:

Select material on the level of the pupil's reading ability, for the rate of reading varies with the ease or difficulty of the material being read.

See that all the pupils begin and stop at the same time. Say to them in substance: "I want to see how much you can read in three minutes. Read as fast as you can but remember that you will be called upon to tell what you have read. Try to make a better score today than you did at your last practice. Place a mark at the end of the line you were reading when told to stop."

Have the pupils reproduce what they have read in some form. Have them give the main points in what they have read or answer a definite set of questions prepared beforehand by the teacher. Distribute these questions so that each pupil may expect to be called upon at any time. The reproductions may be oral or written but they should be oral in most cases because written reproductions take too much time.

The pronunciation and meaning of difficult words should be studied before the silent reading is begun.

The number of lines read in three minutes is the pupil's score. Have him count the number of lines read and make a graph showing his daily performance.

Alternate the reading and the reproducing, giving the pupils as much practice as possible within the limits of the practice period. Continue this practice until the pupils have attained the desired amount of speed.

2. Word recognition. The aim of drill on word recognition is to connect the visual form of the word with its auditory form and with its meaning. Through his experiences outside of school the child has learned the auditory form of several hundred words and likewise has acquired their meanings, but he does not know the visual forms of these words. Learning to read is, in part, a process of associating the visual forms of words with their meanings. The primary readers, however, do not provide enough incidental repetition to insure a mastery of a good reading vocabulary. Consequently, formal drill should be provided to insure satisfactory progress in word recognition.

One of the most important problems in this connection is the determination of the words which should constitute the pupil's reading vocabulary. Several studies have been made in this field which show that the school readers differ widely in their vocabularies. There is but little agreement either in the list of words to be learned or in the distribution of these words among the grades. In view of these facts the teacher should compile a list of words from the adopted reader to be used in connection with a good general word list, such as that given in Thorndike's *Teacher's Word Book*.[1] The Thorndike list assigns to each word a credit number

[1] Thorndike, E. L. *The Teacher's Word Book*. New York. Teachers College, Columbia University. 1921.

which indicates its relative importance. Such a list enables the teacher to distribute her drill more wisely, for she can concentrate her efforts upon the words that will occur most frequently in the pupil's future reading.

Some suggestions on word study follow.

Word study should be introduced with exercises designed to help the child associate the meaning of a word with its visual form. For example, pictures, objects, and action may be employed to establish and strengthen the connections between the visual form of words and their meanings.

Drill should be given on word recognition. The words should be recognized (1) by their position in the sentence, (2) by comparison, and (3) by their form when occurring in promiscuous order. Drill should be continued until the pupil recognizes all important words at sight.

These drill exercises should be motivated by a variety of devices appealing to the native tendencies, such as play, rivalry, showing off, etc.

The drill periods for this type of work should be short—perhaps five minutes is long enough—but they should be distributed at favorable intervals, as once or twice daily. The amount of drill should be determined by the needs of the class.

3. Phonics. The authorities in the field of reading are pretty generally agreed that some training in phonics is an essential phase of the most effective methods of teaching primary reading. But there is a difference of opinion as to the nature and amount

of such training. Perhaps all would agree that phonics should be treated as a means, not as an end. Mary L. Dougherty[1] states her opinion as follows:

> Our aim is not primarily to teach a system of phonics, but to teach children to read. As a means for accomplishing this end phonics has a definite and important place in the primary grades. We shall try to show what this place is by discussion and illustration throughout the book. Briefly stated, it is to help the child to independence in reading by giving him a systematic method of attacking words which present difficulties and preventing the confusion that results from lack of ability to analyze the words effectively. As an end in itself, phonics has no place in the schoolroom. We are not developing linguistic acrobats, and no amount of such skill alone will result in efficient reading.

The commonly used systems of teaching primary reading place varying emphasis upon the phonetic element and advocate different phonetic systems. Some of these systems include a very formal and logical phonetic element; others give much less attention to phonetics. In the opinion of the writer the following statements represent the best practice and the soundest theory:

1. Phonic drills should be separate and apart from the reading exercise itself.
2. The use of an extremely formal system of phonetics

[1] Dougherty, Mary L. *How to Teach Phonics.* p. 4. Used by permission of, and arrangement with, Houghton Mifflin Company, the authorized publishers, New York.

centers the pupil's attention on word mastery rather than on thought getting.

3. Phonetic analysis has the following values:

   a. It helps the child in mastering new words.

   b. It leads to distinct pronunciation and clear enunciation.

4. Motivation should be provided through games and other devices for stimulating interest in phonetic drill.

5. The use of diacritical marks should be reduced to a minimum. Freeman recommends that they be used sparingly. They are not greatly needed in the early years of a child's schooling. Their chief value is to enable the child to get the pronunciation of a word from the dictionary.

6. Rules should be developed from the pupil's experience instead of being formally memorized. Only a few of the most important rules should be taught.

7. The teacher should follow some system of phonetics. Almost any system will give better results than haphazard procedure. Teachers' manuals are now available with practically every modern set of school readers. These manuals contain complete phonetic systems, with detailed explanations and illustrations of the method of procedure in teaching phonics grade by grade.

The method of conducting drill work in reading has been so thoroughly worked out in the teachers' manuals accompanying the school readers and in the excellent books on the teaching of reading that any extended treatment here would be largely superfluous. The inquiring teacher is referred to these manuals and special method books for detailed in-

formation on the method of teaching reading. The material is abundant and the method of procedure is worked out in great detail.

4. Language and Grammar

On the knowledge side, learning language and grammar is a process of building up a system of abstract ideas, rules, and principles. Learning to apply language and grammar in one's speech and writing is, however, a process of habit forming which requires a large amount of practice. It is one thing to know that verbs should agree with their subjects in number but it is a much more difficult thing to make verbs agree with their subjects in number in speaking and writing. Too often the school spends most of its time in teaching the rule or principle and gives little or no attention to establishing the habit of applying the knowledge acquired. Perhaps as much as three fourths of the time devoted to language and grammar should be spent in drill on the application of rules and principles. Of course, the principles should be developed carefully but this is only the first step in teaching language; the development must be followed by practice in the application. Moreover, much of this practice should be given in the form of drill exercises. These drill exercises may be prepared by the teacher or they may be obtained from several

publishing companies in the form of practical exercises. Unless the teacher is an expert in preparing drill exercises and has an abundance of time to give to this work, she would do well to use the ready-made material. Undoubtedly, this material is more convenient to use and in all probability is more systematic than material improvised by teachers. The following sample pages illustrate the character of this ready-made material.

EXERCISE 25 [1]

NAME_____ DATE_____

Insert the correct form of "lay" or "lie" in the blanks.

1. He.....the book on the table.
2. He.....down without a word.
3. She.....down for a much-needed rest.
4. The letter had.....on his desk for hours.
5. The boy.....the telegram on the desk and rushed away.
6. As the tree falls so shall it.....
7. He.....the blame on both of us.
8. Rip Van Winkle had.....on the mountain side for twenty years.
9. We have.....in a good stock of supplies.
10. Will you let your money.....idle all next year?
11. The watch had.....ten years exactly where he had dropped it.
12. The vessel was.....on her beam ends.
13. Don't leave things.....round your room.

[1] *Practical Exercises in English*. Published by Ginn and Company, Boston.

14. Where did you.....my coat? It is .....just where you left it.
15. The lake.....at the entrance to the foothills.

There is a teachers' manual, designed as a ready reference and guide for the teacher, to accompany the exercises.

Exercises like the foregoing may be used as test material, following a period of practice with improvised material. The papers should be graded carefully and each pupil informed of his score. Graphs or charts showing the class scores and the relative standing of each pupil should be made. The exercise should be timed and all the pupils required to start and stop at the same time. Rivalry and other native tendencies may be appealed to for motivation.

How to use competition as a source of motivation is well illustrated in the following exercises.[1]

(Page 21)

Mental Basket-ball Tournament

You are the manager of your mental basket-ball team. You direct the five players: your book, these exercises, your fountain pen, your disposition to work, and your brain. Your teacher is the referee. There are as many teams competing in this tournament as there are members of your class.

[1]Whitfield, Ruth M. "Introduction" and "Game Number 7." *High School English Exercises.* Published by Henry Holt and Company, New York.

Each game consists of ten tests. Each test that you pass correctly counts two points, which is the same as making a basket in basket ball. For each test passed "chalk up" two (2) points to your credit on the score board at the bottom of each sheet on which the sentences are printed. At the end of the game add the points and write the total in the space provided for it on the score board.

Perhaps, in your class, a Recorder of the Tournament will be appointed who will keep a public record of the daily scores of all the teams. Maybe you would like to call your team by a descriptive title, such as the "Reds" or the "Gumps" rather than by your own name.

Make up your mind that your team is going to defeat the other teams and win the class tournament. It can do so by making the highest average score in the games that you play. The last page contains a form on which you are to record your daily scores. Keep your record up to date so that you can hand in your complete score at the end of the tournament.

SAMPLE SCORE BOARD

1	2	3	4	5	6	7	8	9	10	Baskets	Score
2	0	0	2	0	2	2	2	0	2	6	12

(Page 28)

Game Number 7. Agreement in Number

Underline the verb that should be used in each of the following sentences:

1. The importance of athletics (need, needs) not be argued.
2. (Has, have) either of the committees reported yet?
3. The coach, as well as the members of the team (deserve, deserves) praise.
4. None (is, are) permitted to play on the team except those who have practiced faithfully.
5. There (is, are) five books lying on the table.
6. Everyone I have talked to (refuses, refuse) to believe that it was John's fault.
7. The company (regret, regrets) the delay in the shipment of the goods.
8. A vase of flowers (brighten, brightens) the room.
9. Ten cents (is, are) the price of the tablet.
10. The list of club members (has, have) been posted on the bulletin board.

(H. S. E. pages 373, 382; J.E ., 355-356)

SCORE BOARD

1	2	3	4	5	6	7	8	9	10	Baskets	Score

NAME_____

ENGLISH_____ PERIOD_____ DATE_____

In addition to these practical exercises the teacher should use the standardized tests occasionally to measure the progress of the class in punctuation, the use of pronouns and verbs, and other phases of the language. Several standard tests in language and grammar are now available, all of which are

useful in measuring the progress of a class and some of which have a distinct value in enabling the teacher to discover the needs of her class.

Furthermore, the teacher should make an effort to develop a "linguistic conscience" on the part of the pupil; that is, a recognition of the value of clear and forceful expression and a desire to speak and write correctly. Drill exercises can accomplish very little unless the pupil makes an honest effort to apply what he learns to the improvement of his everyday speech. Continual practice in correcting errors in other classes and outside of school will have more effect than the drill exercises, no matter how skilfully these may be conducted.

The authors of some of the newer textbooks in language are recognizing the place of habit forming in the acquisition of language and are placing more emphasis upon systematic drill exercises. For example, Rader and Deffendall, in their series, *The Doorway to English*, published by the Johnson Publishing Company, advocate the use of numerous practice charts. They say in the preface:

> The *use* of correct English is largely a matter of habit. In this series language games (particularly in the third and fourth grades) and practice charts have been provided. By means of games, repetition is secured through an activity the child likes. The teacher must remember that she is working to establish correct language habits and should give the games a place on the daily program.

She should have the children play the same game many times, because the more it is played, the better they can play it. It is a good caution, therefore, to advise against leaving a game the minute the children learn to play it well.

Numerous practice charts, containing sentences that show the correct use of difficult verbs, pronouns, adjectives, and adverbs, are given. Pupils are directed to repeat the sentences until the correct forms "sound right" to them. In Book One these charts immediately precede the language games, the better to prepare the children for the latter. For example, the game "Sit and Set" is preceded by a chart of sentences showing the correct use of the two words.

5. History

There are no very reliable standards to guide practice with respect to drill work in history. Learning history requires largely assimilative thinking and problem solving. Nevertheless, there are certain materials that may well be made the subject of drill. Perhaps the best authorities on the teaching of history would agree that pupils should be drilled in the following phases of history.

1. Map making. All events in history must occur in some particular place and the nature of these events is determined to some extent by geographical conditions. Maps aid the pupils in grasping the place relationships of events and also in understanding the significance of geographical factors in shap-

ing the course of events. As Doctor Johnson says, they "assist the pupil in keeping history on the earth." Frequent use should be made of wall maps and pupils should be taught to construct maps showing the location and progress of events. Map construction should be limited, however, to a few important maps representing the geographical background of large divisions and significant movements in history. A Committee[1] on Progressive Requirements in American History for Junior and Senior High Schools, of which R. M. Tryon was chairman, recommended the following list of maps for the upper grades and the junior high school:

1. North America North of Mexico
2. Discovery and Exploration
3. Conflicting Claims of Territory in 1650
4. Progress of Settlement to 1750
5. North America North of Mexico in 1763
6. The United States in 1790
7. Progressive Territorial Map of the United States to 1853
8. Admission of States and the Status of Slavery to 1860
9. The United States and Her Possessions Today

Outline maps may be used as a basis for the construction of these maps. The pupils should be drilled upon their contents until they can fill in all important items from memory. Likewise, map construction

[1]Tryon, R. M. *School Review*. XXVI: 473-489.

and chart making are recommended for the senior high school.

2. Dates and events. Events with their dates are cases of simple associative learning and are therefore materials for drill. But no effort should be made to remember all the dates of history. Some are more important than others because they mark the beginning or end of an important movement or the occurrence of a decisive event. The teacher should select wisely the dates to be learned and then provide a sufficient amount of drill to insure their complete mastery. The committee referred to in the preceding section recommends the following list of dates and events for the junior high school.

DATES AND EVENTS

1000—Discovery of America by the Northmen
1453—Capture of Constantinople by the Turks
1492—First voyage of Columbus
1497—John Cabot discovers Labrador
1522—End of Magellan's voyage around the world
1565—Founding of St. Augustine
1588—Defeat of the Spanish Armada
1607—Settlement of Jamestown
1608—Quebec settled by the French
1614—New Netherland settled by the Dutch
1619—Slavery introduced into Virginia
1620—Settlement of Plymouth
1630—Settlement of Boston
1682—Founding of Pennsylvania

1763—Peace of Paris
1765—Stamp Act controversy
1775—Lexington and Concord
1776—Declaration of Independence (July 4)
1783—End of the Revolutionary War
1789—Northwest Ordinance
1789—Washington inaugurated president
1790—Taking of the first census
1793—Invention of the cotton gin
1803—Purchase of Louisiana
1807—Fulton's steamboat
1812—War with England
1819—Purchase of Florida
1820—Missouri Compromise
1823—Monroe Doctrine
1830—The beginning of the era of railroad building in the United States
1831—Cyrus McCormick's reaper
1844—Morse's telegraph
1845—Annexation of Texas
1846—Howe's sewing machine and the accession of Oregon Territory
1848—The end of the Mexican War and the discovery of gold in California
1850—The Great Compromise
1853—The Gadsden Purchase
1854—The Kansas-Nebraska Act
1857—Dred Scott decision
1860—The Election of Lincoln and secession of South Carolina
1863—Emancipation Proclamation (January 1)
1865—Lee's surrender (April 9)
1866—First permanently successful Atlantic cable

1867—Purchase of Alaska
1871—Settlement of the Alabama claims
1876—Invention of the telephone and the centennial at Philadelphia
1878—Invention of the arc light for streets and parks
1898—Spanish-American War
1914—Beginning of the World War (August 4)
1915—Opening of the Panama Canal
1917—United States enters the World War (April 6) and purchases Virgin Islands

A few recent dates should be added to this list to bring it down to the present time. A similar list is recommended for the senior high school.

3. Historical personages. The pupils should know something of the great characters of history. They should be familiar with the personalities of the men and women who have made history. They should know what each of these great characters has contributed to the progress of mankind. Tryon recommends a shorter and a longer list of names to be learned by all pupils. A pupil should be able to write about two hundred words of interesting and informing material about each character on the shorter list and to identify each character on the longer list. To identify means to write a short statement giving the salient facts; e. g., "Eli Whitney invented the cotton gin in 1793. This invention was a great boon to the cotton in-

dustry." Tryon's shorter list for the junior high school contains the following names:

Samuel Adams	Thomas Jefferson
Thomas H. Benton	General Lafayette
Daniel Boone	La Salle
John C. Calhoun	Robert E. Lee
Henry Clay	Abraham Lincoln
Christopher Columbus	James Madison
Jefferson Davis	John Marshall
Dorothea Dix	William McKinley
Stephen A. Douglas	James Monroe
Cyrus W. Field	Samuel F. B. Morse
Benjamin Franklin	William Penn
Robert Fulton	William Pitt
Ulysses S. Grant	Harriet Beecher Stowe
Alexander Hamilton	George Washington
Patrick Henry	Daniel Webster
Andrew Jackson	Eli Whitney

The longer list comprises over a hundred names and is fairly representative of all phases of our national life: politics, literature, education, religion, exploration, and invention. Two lists, similar to the preceding ones, are recommended for the senior high school.

Provision should be made, therefore, for the regular and systematic drill on the three phases of American history recommended in this section. The teacher should, before the work for the year begins, make a list of the maps to be constructed, the dates

and events to be learned, and the characters to be known and identified. Then she should introduce each item in its proper time and place and provide for enough practice or repetition to insure mastery. For example, in teaching the period of Discovery and Exploration, map No. 2 of the list on page 252, should be required, the dates and events belonging to this period should be introduced and drilled upon until mastery is complete, and the important personages of the period studied until the pupil is able to know and identify them according to the standards previously announced. Similarly, these same items of drill should be introduced into each of the other periods of history in their proper setting.

Tests of the objective type should be given frequently to check up on the progress of the pupils in obtaining a mastery of these drill materials. Map construction may be tested by requiring the pupils to draw a certain map from memory. Matching exercises can be used effectively to test the pupil's knowledge of dates and events. Make a list of dates and opposite it write a list of events arranged in promiscuous order. Require the pupils to match the events with the correct dates. Number the dates and have the pupils write the number of the correct date before each event. This test might take the following form:

	Dates	Answer	Events
1.	1000	.....	First voyage of Columbus
2.	1492	.....	Discovery of Labrador by Cabot
3.	1497	.....	Founding of St. Augustine
4.	1522	.....	Defeat of the Spanish Armada
5.	1565	.....	Discovery of America by Northmen
6.	1588	.....	Founding of Pennsylvania
7.	1607	.....	End of Magellan's voyage around world
8.	1619	.....	Settlement of Plymouth
9	1620	.....	Slavery introduced into Virginia
10.	1682	.....	Settlement of Jamestown

Similarly, the pupil's knowledge of noted personages may be tested by giving him a list of names to identify or a name from the shorter list, with the request that he write about two hundred words giving the salient facts in regard to this character.

In addition, the true-false and best-answer tests, described in a later chapter, may be used to advantage to test the pupil's mastery of drill materials.

All the test papers should be graded carefully on a point scale and each pupil informed of his score. Graphs may be made showing the standing of the class on these tests. Pupils should be encouraged to try to improve their rank in class. Both group and self competition may be employed to stimulate greater effort among the pupils.

6. Arithmetic

The teacher of arithmetic is confronted with two main problems relating to drill: (1) What phases of arithmetic should be made thoroughly automatic through drill? and (2) How should drill be conducted? Scientific investigations have shown that pupils will learn arithmetic more rapidly through somewhat formal drill than they will through incidental drill. But these investigations throw little light on the specific processes that need to be subjected to drill or on the most effective methods of conducting drill. The suggestions that follow are intended to aid the teacher in solving these vital problems.

1. *What phases of arithmetic should be made thoroughly automatic through drill?* Most writers on the teaching of arithmetic emphasize the importance of drill but few, if any, of them attempt to state specifically all the phases of arithmetic that should be completely mastered through the processes of drill. Consequently, this point is clouded in more or less obscurity. The following list is offered as a tentative answer to this question:

a. Reading and writing of numbers
b. Number combinations from 0 to 9
c. Fundamental operations with integers and with fractions
d. Tables of weights and measures

e. Decimal notation and the use of the decimal point
f. Technical terms with their meanings
g. Speed and accuracy in doing exercises and in solving problems
h. Methods of checking and verifying results

If pupils are well drilled on the foregoing factors they should become quick and accurate in arithmetical computation. On the other hand if the pupil fails to master these, he is seriously handicapped in all his work in arithmetic. Thus it will be seen that the teacher's ability to conduct drill exercises is a very important measure of her success in teaching arithmetic. Let us, then, turn our attention to the method of conducting drill.

2. *How should drill in arithmetic be conducted?* The old-fashioned methods of drill in vogue when the writer was a boy in a rural school were extremely wasteful of the pupil's time. In those days the teacher would send the whole class to the blackboard and then read an exercise to be done by all the pupils at the same time. A few of the brighter pupils would do the exercise; a few more would copy the work of the brighter pupils; but the majority of the class would accomplish nothing at all. Consequently, only a few of the pupils got any practice and the little practice they did get was not well distributed. Moreover, the pupils that needed most practice got least. To the well-trained teacher this

may sound like ancient history but, unfortunately, a great many teachers of the present day are just about as wasteful in their methods of conducting drill. In fact, the average teacher has neither the time nor the technical training necessary to enable her to construct scientific drill exercises. She must of necessity accept her drill materials ready made. Perhaps the majority of teachers simply use the material provided by the text and one or more supplementary texts. But are textbooks a safe guide? Thorndike has examined several textbooks to determine the amount and distribution of practice on the various number combinations. He found that the drill was distributed very unevenly. For example, eight times as much practice may be provided on *2 multiplied by 2* as on *9 multiplied by 8*. His data show that even texts of good repute—to say nothing of the poorest—are very unsystematic in their drill exercises. On the basis of several tables showing the amount and distribution of practice in textbooks, Thorndike[1] states:

> Tables 3 to 8 show that even gifted authors make instruments for instruction in arithmetic which contain much less practice on certain elementary facts than teachers suppose; and which contain relatively much more practice on the more easily learned facts than on those which are harder to learn.

[1] From Thorndike, E. L. *The Psychology of Arithmetic*. p. 132. By permission of The Macmillan Company, publishers, New York.

How, then, is it possible for the average teacher to conduct effective drill? Fortunately, good drill materials are now available. Some publishing companies have placed on the market practical exercises in rapid calculation in the form of practice pads that may be had at reasonable prices. Surely, it would be a great improvement over the inefficient methods now in use in many schools if the teachers would have their pupils secure sets of these exercises for use in drill periods. Even though these practical exercises are not always thoroughly scientific they are likely to be superior to the exercises hastily improvised by the average teacher. Moreover, they make it possible for the teacher to provide practice for each pupil during the entire drill period, thus eliminating the waste of time due to the reading and copying of problems and to the lack of opportunity for pupil participation.

More carefully prepared material is available, however, in the form of standard practice tests or exercises. These exercises are designed to measure a pupil's arithmetic abilities, diagnose his difficulties, and provide the practice necessary to remedy the defects in his work. Teachers' handbooks are provided which describe the tests and exercises and explain how to use them. By using these practice tests the teacher is able to give systematic drill suited to the needs of each pupil. Some of the most

widely used sets of exercises, as well as one of the newest, are listed and briefly described in the following paragraphs. The writer does not attempt to say which set is best but he does recommend and urge that the teacher select a set of exercises from the following list, or some other set if she prefers another.

1. The Studebaker Economy Practice Exercises. This material may be purchased from Scott, Foresman and Company, Chicago. The set provides drill material for grades 4 to 8. The material is printed on cards 6½″ x 9″. Small slits in the cards just below each example make it possible for the pupil to write the answers on practice paper placed beneath the card. Then the pupil can turn his card over and check his results with the answers printed on the back of the card. This provides a quick and accurate means of checking up daily on the pupil's work. Definite standards of attainment are kept constantly before him. The progress of the pupil may be represented graphically. (See experiment 1, chapter XIII, for a practice experiment with the Studebaker material.)

2. The Courtis Standard Practice Tests. This material is published by the World Book Company, Yonkers-on-Hudson, N. Y., and like the Studebaker material is for use in grades 4 to 8. The set consists of 48 drill exercises on the fundamental operations. Lessons 13, 30, 31, and 44 are test cards. A teachers' manual giving full directions for using the material is provided with each set of exercises. The exercises are printed on cards and practice pads of thin transparent paper are

provided for the pupils. The card is placed underneath the paper and the results are written in the appropriate place. Then the pupil checks his work by comparing his answer with the correct answers printed on the reverse side of the card. The first step is to give Test 13 to all the class. The pupils passing this test are excused from practice on the first 12 cards. Those failing to pass begin practice with the first card in the series and practice on all of the first 12, then try the test again. The pupils that pass Test 13 are given a higher test and begin practice at the point in the series at which they are found to be deficient. Practice is continued until all the pupils are brought up to the standards for the grade or until the teacher feels that further practice would not be profitable. Provision is made for representing the pupil's progress graphically.

3. *Lennes' Work, Drill, and Test Sheets in Arithmetic.* The tablets containing this material are published by Laidlaw Brothers. The material is for use in grades 2 to 8. The work, drill, and test sheets provide all the supplementary drill material that is needed for a full year's work. They are sold in sets of 96 envelopes for each grade, or they may be purchased in tablet form, each tablet containing all the sheets for one grade arranged consecutively. The authors of this material have attempted to control drill quantitatively; that is, they provide more drill on the difficult combinations and less on the easy ones. Competitive tests provide another important feature. There are 16 of these tests for grades 2 and 3, and 33 for grades 4 to 8. There are simple score cards which enable a teacher to check the results of these tests and to diagnose the difficulties of the pupils. The material is comparatively easy to

handle. The answers to each set of exercises are printed on a detachable slip. So there is nothing to collect and put away after an exercise is finished.

Other sets of material similar to the foregoing are: (1) The Newcomb Fundamental Drill Exercises in Arithmetic, published by R. S. Newcomb, Ada, Oklahoma; (2) the Osborn Corrective Exercises in the Fundamentals of Arithmetic, published by Houghton Mifflin Company, New York; and (3) Arithmetic Work-Books, published by Scott, Foresman and Company, Chicago.

In some of the recent texts in arithmetic drill materials are being incorporated into the body of the text as well as on separate sheets. A notable example of this type is found in the *Alexander-Sarratt Arithmetics*, published by the Johnson Publishing Company, Richmond, Va., features of which are Diagnostic Tests and Drill Cards. This series, consisting of three books, Primary, Intermediate, and Advanced, makes ample provision for scientific drill.

More specifically, how should drill in arithmetic be conducted? Some plan like the following may be devised by the teacher to meet the needs of her class:

1. Test the class with some good standard test in arithmetic. This test should be given near the opening of the school year.

2. Test the class with a diagnostic test as a means of discovering the defects in each pupil's work.

3. Plan remedial work designed to help the pupil to master his difficulties. In general, proceed as follows:

1) Select a set of practice material: e. g., the Courtis, the Studebaker, the Lennes, or some other.

2) Provide each pupil with the material necessary to help him overcome his difficulties.

3) Arrange short daily drill periods. These periods should be 5 to 10 minutes according to the time allotment for the grade, as is explained in the teachers' manual furnished with each set of exercises.

4) Encourage each pupil to make an effort to reach the standards recommended by the author of the practice material.

4. Introduce group and self competition. Alexander and Sarratt recommend games and contests: e. g., a track meet, a relay race; and various kinds of competition.

5. Check up daily on the progress of each pupil. Each set of material makes ample provision for this point, thus reducing the labor of scoring to a minimum. Plot a graph based upon the pupil's daily records; another graph based upon the class records, showing the highest, lowest, and median scores. Teach the pupils how to compare their progress with the progress of the class.

6. Continue this practice until the class has reached the standards for the grade.

7. Repeat the standard test given at the beginning of the practice period to measure the progress of the

class. If possible a different form of the test should be used.

8. Give due attention to the phases of arithmetic requiring drill but not included in the standard practice material. Most sets are limited largely to the fundamental operations. Other phases should be drilled upon according to the needs of the class.

For more extensive material on drill in arithmetic the reader is referred to some of the newer books in the field:

Hall-Quest, A. L. *Supervised Study in the Elementary School.* Chap. XIII.

Hillegas, M. B. *Teaching Number Fundamentals.* 1925.

Lennes, N. J. *The Teaching of Arithmetic.* 1923.

Newcomb, R. S. *Modern Methods of Teaching Arithmetic.* Chaps. III, V, and XV.

Pressey, S. L. and L. C. *Introduction to the Use of Standard Tests.* Chap. 5. 1922.

The Second Yearbook of the Department of Elementary School Principals. Chap. VIII. 1923.

Thorndike, E. L. *The New Methods in Arithmetic.* Chaps. IV and XIII. 1921.

——*The Psychology of Arithmetic.* Chaps. I to VIII. 1922.

Teachers' Handbooks for Standard Practice Materials.

7. Hygiene

There are two important objectives in teaching hygiene: (1) the acquisition of health knowledge and (2) the establishing of health habits. Of the

two the latter is the more important, for doing is more helpful than mere knowing. Nevertheless, the teaching of hygiene in the past has devoted itself largely to the acquisition of knowledge. Grades were based primarily on the pupil's ability to perform certain knowledge stunts, such as naming all the bones in the body, describing the circulation of the blood, following a mouthful of food through all the changes from mastication to the final stages of assimilation, and picturing in lurid terms the evil effects of alcohol and tobacco on the vital organs. In recent years, however, the emphasis is being placed upon healthful living, that is, upon health habits.

Now the acquisition of health habits is a process of simple associative learning and, of course, involves the principles of habit formation particularly, motivation, identification of the bonds to be formed, practice on the exercises of these bonds, and checking up on the progress of each pupil.

Motivation should grow largely out of the pupil's appreciation of the value of health and his desire to be healthy in order that he may win in the race of life. The first step, then, in forming a habit is the acquisition of the knowledge upon which the habit is based. For example, the habit of caring for the teeth should grow out of a knowledge of the value of a good set of teeth and how to care for them.

This will make clear to the pupils just what habits should be formed and why they should be firmly established. Other motivating devices may be employed, such as the desire for approval, competition, and some method of checking up frequently on the progress of each pupil.

The pupils should be made clearly conscious of the habits to be formed. They should make a list of desirable health habits as these occur in the progress of the work in hygiene. Since health habits must be the real goal in the teaching of hygiene, grades should be based in part upon tests for habit formation. The list of habits to be formed should include these:

Cleanliness of face, hands, and body
Correct posture in sitting and standing
Care of the eyes
Care of hair and nails
Use of individual drinking cups
Use of the handkerchief
Exercise in the open air
Sleeping with the windows open
Eating at regular times and nothing but plain, wholesome food
Wearing clothes suitable to the season and climate
Habits of personal safety
Habits of prompt reaction in emergencies

On the other hand certain habits should be avoided, such as:

Spitting on the floor
Coughing with the mouth uncovered
Overeating
Excessive eating of candy
Bad postures
Use of tobacco, alcohol, and narcotics

The above lists are far from exhaustive. The teacher should extend them in so far as she has time and opportunity.

Demonstrations of the habits to be formed should be given in the schoolroom and some practice provided for under the immediate direction of the teacher. For example, if the habit to be formed is that of cleaning the teeth, the teacher should demonstrate how to use a toothbrush and follow this with a toothbrush drill. Habits of reacting to emergencies may be dramatized. The teacher may show how to put on a bandage or how to treat a cut or burn and then have the pupils dramatize these emergency cases. Other emergencies may be similarly dramatized by the pupils.

But practice in the schoolroom can never be sufficient to establish health habits. Most of the opportunities for practice occur outside the schoolroom, particularly in the home and community. The pupil must be encouraged and stimulated to practice health habits at home as well as at school. Consequently, means must be devised for checking up on the pupil's practice in his daily life outside

of school. Some habits, as cleanliness of face and hands and care of hair and teeth, can be checked up readily by inspection. For example, the teacher can ask for a show of hands and note who has clean hands. But many desirable habits are not so readily observed and the teacher must resort to more indirect methods of checking up on these habits. For this purpose a score card of some sort is a very helpful device. A card similar to the one on page 272 may be used to good advantage.

The teacher should explain to the pupils how to use this score card and have each pupil check in his daily scores. Allow at least one point for each habit. More points may be allotted to certain habits because of their greater importance to health or in order to provide greater motivation for their practice. Add the scores on the various habits for the pupil's daily score; add the daily scores for a weekly score; and add these again for a monthly score. The pupil's monthly grade should be based in part on these scores—perhaps they should be counted for as much as 50% of the total score. The teacher should inspect the score cards frequently and should plot graphs based upon the weekly and monthly scores. Points should be distributed among the various habits on the score card so that the total will be the same in all cases. This will enable the pupil to determine whether he is

SCORE CARD FOR HEALTH HABITS[1]

NAME _____ GRADE _____

HABITS TO BE FORMED	DAYS							
	S	M	T	W	T	F	S	Wk.
1. Brushing the teeth								
2. Sleeping with windows open								
3. Taking a complete bath								
4. Using handkerchief properly								
5. Looking up and down the street before crossing								
6. Washing hands before each meal								
7. Seeing that light falls over the left shoulder in reading								
8. Using individual drinking cups								
TOTAL SCORE								

[1]See *Health and Success*, p. 14. By Andress and Evans. Published by Ginn and Company.

gaining or losing from week to week on his scores for habit formation.

Habits should be placed on the score card as they occur in the course of study in hygiene. Perhaps not more than six or eight habits should be on the card at any one time, for the reason that the pupil cannot consciously attend to many things at the same time. Each habit should remain on the card as long as possible but older habits must be dropped as newer ones are added.

Many teachers object to the use of these score cards because the pupils falsify their records. No doubt some pupils do give themselves credit for habits they do not actually practice, but there is more or less cheating in all forms of school work. Pupils copy the work of others, get illegitimate help at home, and cheat on examinations. Nevertheless, the remedy is not to be found in the abolition of these forms of school work but in properly safeguarding them, in making dishonesty annoying and honesty satisfying.

Summary of section. The section may be briefly summarized as follows:

1. The two main objectives in hygiene are: (1) the acquisition of health knowledge and (2) the formation of health habits.

2. Motivation should grow out of the consciousness of the need for health habits and the appeal to native

wants, such as the love of approval, competition, and the desire for mastery.

3. The teacher should help the pupils identify the exact bonds to be formed through demonstrations and through dramatization.

4. Place the emphasis on health habits by drilling the pupils in school and by keeping a record of their practice outside of school.

The teacher should be familiar with the following books:

Andress, J. Mace. *The Teaching of Hygiene in the Grades.*
Bancroft, J. H. *The Posture of School Children.*
Fisher and Fisk. *How to Live.*
Gulick, L. H. *The Efficient Life.*
Terman, L. M. *The Hygiene of the School Child.*

CLASS EXERCISES

1. How can spelling be motivated? Handwriting? Arithmetic? Language? Reading? History? Hygiene?

2. What can the teacher do to aid the selective factors in directing the learning of handwriting? Spelling? Arithmetic? Hygiene?

3. Devise a plan for checking up frequently on a pupil's progress in handwriting. Devise a similar plan for spelling, arithmetic, and other school subjects.

4. How would you determine the length and distribution of practice periods in the various subjects?

5. How much time should be given to handwriting?

Spelling? Arithmetic? Reading? How should this time be distributed in each case?

6. How can a teacher control the attitude of the learner?

7. Write out a plan for directing the study of spelling that will provide for all the essential factors of simple associative learning. Make similar plans for handwriting, arithmetic, and other subjects.

8. Examine the Courtis Standard Practice Tests for arithmetic and for handwriting. Explain how this material should be used.

9. Examine the Studebaker Economy Practice Exercises. How should this material be used?

10. Similarly, make a study of the Lennes Work, Drill, and Test Sheets in Arithmetic. What use could the teacher make of this material?

11. Make a critical study of the Starch and Mirick and the Horn-Ashbaugh spellers. Make a similar study of other modern spellers.

12. Have each student make a complete plan for the supervision of study in one subject in so far as this subject involves simple associative learning.

13. Make a list of the drill materials available for arithmetic and language, giving publishers, prices, and grades in which the material should be used.

REFERENCES FOR CLASS USE

1. Book, W. F. *Learning to Typewrite.* Part III. New York: The Gregg Publishing Company. 1925.

(An excellent discussion of the rôle of the teacher in directing the acquisition of skill.)

2. Brooks, F. D. *The Applied Psychology of Reading.* New York: D. Appleton and Company. 1926.
(Interprets and applies the most important scientific studies of the reading process.)

3. Brown, J. C., and Coffman, L. D. *How to Teach Arithmetic.* Chaps. VIII-XI. Chicago: Row, Peterson & Company. 1914.
(Discusses the value of drill, the elimination of waste in teaching arithmetic, and teaching the fundamentals.)

4. Colvin, S. S. *An Introduction to High School Teaching.* Chaps. IX and X. New York: The Macmillan Company. 1917.
(A clear and definite discussion of the nature and function of drill and economical methods.)

5. Davis, S. E. *The Technique of Teaching.* Chaps. II and V. New York: The Macmillan Company. 1922.
(Chapter II is a good brief discussion of the teaching of spelling; chapter V is a similar treatment of arithmetic.)

6. Earhart, Lida B. *Types of Teaching.* Chap. XII. New York: Houghton Mifflin Company. 1915.
(A brief discussion of the drill lesson. Outlines the steps of a drill lesson.)

7. Freeman, F. N. *The Psychology of the Common Branches.* Chaps. II, IV, VI, and IX. New York: Houghton Mifflin Company. 1916.
(Psychological background for the teaching of handwriting, reading, spelling, and arithmetic.)

8. Freeman, F. N. "Principles of Method in Teaching Writing As Derived from Scientific In-

vestigations." *The Eighteenth Yearbook of the National Society for the Study of Education.* Part II. Bloomington, Ill.: Public School Publishing Company. 1920.

9. Freeman, F. N. *How Children Learn.* Chap. VIII. New York: Houghton Mifflin Company. 1917.
(A good discussion of the classes of sensori-motor learning, and of the methods and factors of this type of learning.)

10. Gray, W. S. "Principles of Method in Teaching Reading As Derived from Scientific Investigations." *The Eighteenth Yearbook of the National Society for the Study of Education.* Part II. Bloomington, Ill.: Public School Publishing Company. 1920.

11. Gregory, C. A. "Reading Vocabulary of Third Grade Children." *Journal of Educational Research.* VII: 127-131. 1923.
(A report of an investigation to determine the vocabularies of third-grade children. Vocabularies found to be considerably larger than is generally supposed.)

12. Hall-Quest, A. L. *Supervised Study in the Elementary School.* Chaps. IX-XIII. New York: The Macmillan Company. 1924.
(Contains a chapter, including a bibliography, on each of the following: spelling, handwriting, language, and arithmetic.)

13. Holley, C. E. *The Teacher's Technique.* Chaps. VIII and XIV. New York: The Century Co. 1922.
(Discusses the technique and principles of drill. Gives some good devices.)

14. HORN, ERNEST. "Principles of Method in Teaching Spelling As Derived from Scientific Investigations." *The Eighteenth Yearbook of the National Society for the Study of Education.* Part II. Bloomington, Ill: Public School Publishing Company. 1920.

(States definite principles and cites the investigations on which the principles are based.)

15. KIRK, H. H. "Time Distribution by Subjects and Grades." *The Elementary School Journal.* XXIII: 535-541. 1924.

(A study of the time distribution among the elementary subjects, grades 1–6, in the schools of North Dakota. This study contains a table of distribution by subjects and grades, based on the analysis of thirty school programs.)

16. MONROE, W. S. "Principles of Method in Teaching Arithmetic As Derived from Scientific Investigations." *The Eighteenth Yearbook of the National Society for the Study of Education.* Part II. Bloomington, Ill.: Public School Publishing Company. 1920.

(Gives specific rules for the guidance of the teacher.)

17. NUTT, H. W. "Rhythm in Handwriting." *The Elementary School Journal.* XVII: 432-435. 1917.

(A report of an experimental study of the relation of rhythm to the learning of handwriting. A valuable study.)

18. O'BRIEN, J. A. *Silent Reading.* New York: The Macmillan Company. 1921.

(A report of an experiment in improving the rate of reading. Very suggestive to the teacher.)

19. O'Brien, J. A. *Reading: Its Psychology and Pedagogy.* New York: The Century Co. 1926.
(Presents the results of scientific investigations in the field of reading, with practical applications. A valuable book for the teacher of reading.)

20. Parker, S. C. *Methods of Teaching in High Schools.* Chaps. VI, VII, and VIII. Boston: Ginn and Company. 1920.
(A valuable discussion of habit forming and drill. Gives definite suggestions to the teacher.)

21. Parker, S. C. *Types of Elementary Teaching and Learning.* Chaps. III, IV, and V. New York: Ginn and Company. 1923.
(Clear and definite treatment of the main problems involved in teaching handwriting, spelling, and beginning reading. Based on scientific investigations.)

22. Pennell, Mary E., and Cusack, Alice M. *How to Teach Reading.* Chaps. V and VI. New York: Houghton Mifflin Company. 1924.
(A good summary of the main factors in teaching reading with definite suggestions to the teacher.)

23. Smith, W. A. *The Reading Process.* Chaps. V, VII, and VIII. New York: The Macmillan Company. 1922.
(A discussion of the principles underlying method. Based on scientific studies.)

24. Strayer, G. D. *A Brief Course in the Teaching*

Process. Chap. IV. New York: The Macmillan Company. 1911.

(Brief, but a good statement of the function of the teacher in conducting drill.)

25. TAYLOR, J. S. *Supervision and Teaching of Handwriting.* Richmond, Virginia: Johnson Publishing Company. 1926.

(A valuable treatise, summarizing and applying the scientific studies in this field.)

26. WILSON, H. B., AND WILSON, G. M. *The Motivation of School Work.* Chaps. V-IX. New York: Houghton Mifflin Company. 1911.

(Shows how the fundamental subjects may be motivated.)

27. WAPLES, DOUGLAS. *Procedures in High-School Teaching.* Chap. XVII. New York: The Macmillan Company. 1924.

(Outlines the main steps in drill and suggests exercises in application.)

Note. There is an abundance of material which, for lack of space, could not be included in the foregoing list. Students desiring more material may locate it readily through the use of *The Reader's Guide to Periodical Literature* and bibliographies appended to several of the references in the list.

CHAPTER VII

FACTORS OF ASSIMILATIVE THINKING

Questions to Be Kept in Mind When Reading

1. What are the main processes in reflective reading?
2. What reactions should a pupil make to reading material?
3. What must a pupil have done to justify the statement that he has read a selection?

Assimilative thinking, as explained in a previous chapter, refers to the reflective type of reading. Cursory reading, that is, reading merely for pleasure or for entertainment, is not here dignified by the term *thinking*. The general nature of assimilative thinking was set forth in chapter IV; the specific aim of the present chapter is to analyze this type of study into its main factors and to describe and illustrate these factors. The main problem may be stated thus: What reactions must one make to printed material to justify the statement that he has read the material? Or, What reactions should a pupil make when he is assigned for study a chapter in history or geography or any other text? First, let us examine the analyses of a few of the leading contributors to the study of this problem.

1. McMurry,[1] in *How to Study and Teaching How to Study*, analyzes the process of studying into eight factors:

1. Providing for specific purposes
2. Supplementing thought
3. Organizing ideas
4. Judging the soundness and general worth of statements
5. Memorizing
6. Using ideas
7. Providing for a tentative attitude toward knowledge
8. Allowing for individuality

McMurry devotes one chapter of his book to each of the foregoing factors, discussing in detail the nature and function of each. He also gives some practical suggestions as to how to train pupils in the use of these factors. The type of study indicated is essentially the same that the present writer has elected to call *assimilative thinking* or *reflective reading*.

2. Parker[2] discusses both cursory and reflective reading in *Types of Elementary Teaching and Learning*. The latter type of reading he analyzes into the following factors:

[1]McMurry, F. M. *How to Study and Teaching How to Study*. Used by permission of, and arrangement with, Houghton Mifflin Company, the authorized publishers, New York.

[2]Parker, S. C. *Types of Elementary Teaching and Learning*. Chap. XI. Ginn and Company, Boston. 1923.

1. Making detailed analyses of meanings
2. Grasping and organizing the main points of an article or chapter
3. Reading to remember the main ideas
4. Evaluating statements
5. Making bibliographical researches

In addition to the foregoing factors Parker emphasizes the importance of interest, of apperceptive masses, of an extended reading vocabulary, and of practice in silent reading.

3. Thorndike,[1] in an article on "Reading as Reasoning," points out several factors that play an important part in the reading process, among which are these:

1. The mental set, or purpose
2. The selection of the proper connotation of each word
3. The weighing or evaluation of each of the many elements in a sentence
4. The selection of the right elements of the situation and the organizing of them under the influence of the right mental set, or purpose

In explanation of the foregoing statements, Thorndike says:

In correct reading (1) each word produces a correct meaning, (2) each such element of meaning is given

[1]Thorndike, E. L. "Reading as Reasoning." *Journal of Educational Psychology.* V: 323-332. Warwick and York, Inc., Baltimore, Md.

a correct weight, and (3) the resulting ideas are examined and validated to make sure that they satisfy the mental set or purpose for whose sake the reading was done.

Again Thorndike says:

Understanding a paragraph is like solving a problem in mathematics. It consists in selecting the right elements of the situation and putting them together in right relations, and also with the right amount of weight or influence or force for each. The mind is assailed as it were by every word in the paragraph. It must select, soften, emphasize, correlate, and organize all under the influence of the right mental set or purpose or demand.

4. Lyman[1] analyzes reading for study as follows:

1) Look first for the author's statement of his main idea.
2) Keep this main idea in mind as you read.
3) Notice how various parts of a selection bear upon the writer's main idea.
4) Vary the rate of reading in accord with your reading purpose and with the nature of the materials. A rapid first reading is often helpful.
5) Reread deliberately, paying special attention to essential parts.

An examination of the foregoing statements of the processes of reflective reading reveals considerable variation in the factors emphasized by the different writers. These differences are, however,

[1]Lyman, R. L. *The Mind at Work*. pp. 159, 160. Scott, Foresman and Company, Chicago. 1924.

supplementary rather than contradictory. Reading is a very complex process involving numerous factors. One writer may emphasize one set of factors and another writer a largely different set, but the two lists supplement each other. Perhaps all would agree that the following factors are essential, or fundamental:

1. Reading with specific aims or for specific purposes
2. Selecting and organizing the main points
3. Evaluating or judging the worth of the material read
4. Memorizing or fixing in mind the important points
5. Using, or applying, to life situations the ideas acquired

This list, of course, includes only the main processes, the factors that are fundamental to reflective reading. No attempt has been made to include the more specific and detailed elements. Most of these will receive some attention as constituent elements of the larger phases of the reading process. Each of the main factors will be considered in the following pages.

I. Specific Aims, or Purposes, in Reading

1. The example and advice of eminent men. McMurry points out that eminent men have the

habit of setting up specific purposes to guide them in their study. Perhaps this is one reason why these men attain eminence. Such men as Webster do not waste time in aimless reading. Doubtless, ordinary men would do well to establish similar reading habits. If specific purposes are essential for the gifted how much more are they needed by us common mortals? With respect to the need and value of specific aims in reading Noah Porter[1] gives some excellent advice in the following paragraph:

> In reading, we do well to propose to ourselves definite ends and purposes. The more distinctly we are aware of our own wants and desires in reading, the more definite and permanent will be our acquisitions. Hence it is a good rule to ask ourselves frequently, "Why am I reading this book, essay or poem; or why am I reading it at the present time rather than any other?" . . . The distinct consciousness of some object at present before us imparts a manifold greater interest to the contents of any volume. It imparts to the reader an appropriative power, a force of affinity, by which he insensibly and unconsciously attracts to himself all that has a near or even a remote relation to the end for which he reads. . . . The private history of every self-educated man from Franklin onward attests that they were all uniformly not only earnest but select in their reading, and that they selected their books with distinct reference to the purposes for which they used them. Indeed the reason why self-trained men so often surpass

[1] Porter, Noah. *Books and Reading.* pp. 41, 42.

men who are trained by others in the effectiveness and success of their reading, is that they know for what they read and study and have definite aims and wishes in all their dealings with books. The omnivorous and indiscriminative reader, however ardent is his curiosity, can never be a reader of the most effective sort.

Koopman[1] also emphasizes this point. He says:

For it cannot be too strongly emphasized. That merely to read is not enough. . . . To read with purpose, method, and judgment, developing one's own experience in the light of counsel, is therefore the key to the mastery of books.

Teall,[2] in his "volume of friendly and informal counsel," advises:

Before beginning a book the reader should "place" it. He should ask: "What do I know about this subject? What books have I read with which this one may be compared? What else has this author written? What is his 'standing'? What do I expect to find in the book?"

Thus these writers, pointing out that eminent men read with specific purposes, advise purposeful reading for all. Doubtless we would do well to follow the examples cited and the advice given. In fact, aimless reading cannot be reflective. Before one

[1]Koopman, H. L. *The Mastery of Books.* p. 6.

[2]Teall, F. N. *Books and Folks.* pp. 169, 170. G. P. Putnam and Sons, New York. 1921.

can really think he must propose to himself some aim or problem.

2. The problem-solving attitude. The importance of the attitude of the learner in simple associative learning was emphasized in an earlier chapter. Doubtless, attitude is just as important in this type of learning; particularly the problem-solving attitude. According to Dewey and others, the first step in reflective thinking is the location and definition of the problem. Reading is one form of reflective thinking. Consequently, one must assume the problem-solving attitude in order that he may read well. Moreover, everyone knows from his own experience that his reading is more effective when he has a definite problem in mind and is reading for the specific purpose of finding a solution for this problem. Furthermore, attention is selective. One does not focus his attention upon every phase of the material he is reading—only on what he is looking for. On this point Myers'[1] investigation of incidental memory is instructive. After performing several experiments designed to test the memory of materials that have entered the mind only incidentally, Myers asserts:

> We either shut out entirely from our senses those things which are not in accord with our interests and prejudices or we perceive them very imperfectly. We

[1] Myers, G. C. "A Study of Incidental Memory." *Archives of Psychology*. No. 26. New York.

read from the newspaper that which comes within our range of interest; but we may scan lines and pages for some particular fact and in the end know nothing about that which is foreign to the object of our search. . . . That "we see in people and things what we are looking for" is the epitome of human experience.

If, then, we are not looking for anything in particular when we read, the probabilities are that we will remember only scattered fragments of the material and that these will be practically worthless. To give the memory a chance to function the reader must have aims or purposes on the basis of which ideas may be selected and organized.

In performing experiments on the ergograph Wright found that his subjects accomplished more when working under the mental stimulus of a set task than they did without a definite task. In one exercise his subjects were told to work as long as they could and as hard as they could; in another they were assigned a set task to perform. On an average the results were approximately 25% better when a definite task was assigned. If a definite task results in more work on the ergograph should we not confidently expect that reading will be more effective under the stimulus and guidance of a specific aim? Surely a pupil will learn more from his reading if he is assigned a list of questions to be answered or problems to be solved than he will if he is told to read a chapter and learn all that he can. In the

latter case there are no specific aims and the pupil may not assume the problem-solving attitude. Textbook writers are beginning to recognize the value of specific aims and are introducing a topic by proposing a list of questions to be answered or they are closing their chapters with lists of questions and exercises. For example, Starch,[1] in his *Educational Psychology*, introduces the student to the chapter on "Correlation among Human Capacities" by proposing four definite questions to be answered in the body of the chapter; namely:

1. To what extent is a given amount of capacity accompanied in general in the same person by equal, larger, or smaller amounts of any other ability?
2. To what extent may we expect pupils who are excellent, mediocre, or poor in one subject to be excellent, mediocre, or poor in other subjects?
3. To what extent are mental and physical traits correlated?
4. To what extent is ability in childhood or youth a forerunner of ability in adulthood?

In this way the pupil is able to assume the problem-solving attitude and will read to discover what contribution the author is making toward the solution of these problems.

The first essential factor of assimilative thinking is therefore a specific aim toward which the pupil

[1] From Starch, Daniel. *Educational Psychology*. By permission of The Macmillan Company, publishers, New York.

assumes a problem-solving attitude. The specific aim should be formulated as a question or a problem.

II. Selection and Organization of Main Points

The second factor of assimilative thinking is the selection and organization of the main points. Facts have no value unless they are related to some purpose or problem. Having set up a specific aim or formulated a definite problem, the pupil should select and arrange the main points on the basis of their relation to the aim or problem and with respect to one another. As an illustration of this type of work take an extract from an article in *Educational Administration and Supervision*,[1] February, 1923, entitled "The Status of the Bible in the Public Schools." (The main sectional headings are supplied by the writer.)

Specific aim or problem. To what extent is it now permissible to read the Bible, with or without comment, in the public schools?

Discussion. The first question to be raised in this report concerns the legal status of Bible reading in the schools. The search for data in answer to this question has revealed a very interesting variety of laws, interpretations and practices. In seven states (California, Louisiana, Minnesota, Nevada, Utah, Washington, and Wisconsin) Bible reading in the public schools is for-

[1] Ledlow, W. F. and Pettinger, B. F. "The Status of the Bible in the Public Schools." *Educational Administration and Supervision*. February, 1923. Warwick and York, Inc., Baltimore, Md.

bidden by constitutional provision as interpreted by the supreme court or the attorney-general. Even in some of these states, however, it is apparently practiced occasionally in places where there is no local opposition. In direct contrast to these seven states, there are four states (Alabama, Massachusetts, New Jersey, and Tennessee) in which the daily reading of the Bible is compulsory under legislative enactment. A bill to this effect introduced in Maryland failed of passage. In New Jersey the law requires the reading of five verses daily from the Old Testament. The reading must usually be without comment and objectors may be excused from participation.

Between these extremes of proscription and prescription, there are some twenty-two states in which the reading is optional with the teacher or local authorities. In the remaining states its legal status is as yet doubtful. In the "optional" group, either there is no constitutional provision against using sectarian literature in the schools or the Bible has been accepted as nonsectarian by those in authority. The legislature of North Dakota, for example, has declared by statute that the Bible is not a sectarian book. In Georgia the state department of education has ruled that it cannot be excluded from the schools. Elsewhere courts or attorney-generals have made similar rulings or there is no constitutional interdiction upon sectarian literature. It would appear that in several of these states the practice has been established of reading selections from the Bible at morning or general exercises and that this practice is recognized in the absence of adverse rulings.

Now what are the main points in the preceding

paragraph? The pupil should select and arrange these in the form of a brief sentence outline or summary, as follows:

1. Bible reading in the public schools is forbidden in seven states: California, Louisiana, Minnesota, Nevada, Utah, Washington, and Wisconsin.
2. It is required in four states: Alabama, Massachusetts, New Jersey, and Tennessee.
3. In twenty-two states it is optional with the teacher or local authorities.
4. In the remaining states the legal status of Bible reading is yet doubtful. The practice varies.

In this way the pupil should be taught to select and organize the main points in his reflective reading. This is one of the essential reactions.

Specific aims growing out of the pupil's life interests and activities provide the proper basis for the selection and organization of ideas. The pupil, reading with a specific aim or definite problem in mind, should select and organize the material that will satisfy the demand of the aim or lead to the solution of the problem. Only those facts that have a definite bearing on the aim or problem should be selected. The relevancy of the facts to the problem under consideration is the test that must be applied in every case. Organization is simply the arrangement of these facts to show their relation to the aim or problem and to one another.

III. Judging Worth of Material

One cannot afford to read indiscriminately any more than he can afford to eat anything that may be available without regard for his needs or any consideration of food values. Reading may be harmful as well as helpful. It all depends on what you read and how you read. Bacon gave us good advice when he said, "Read not to contradict and confute, nor to believe and take for granted, nor to find talk and discourse, but to weigh and consider." Pupils should be taught to "weigh and consider" what they read. There is an enormous amount of time wasted, both in school and out, in reading material of little value. Frequently, pupils are required to memorize material that is practically worthless. A good illustration of this point is furnished by L. A. Averill.[1] He writes:

> Here is a class in physiology; they are four sun-tanned boys and two healthy, buxom girls. The teacher is "showing them off" before a visitor. Here is a list of six questions which she asks and which are answered in truth if not in spirit:
>
> 1. How many bones are there in the body?
> 2. Name the bones of the upper arm, lower arm, wrist, and hand.
> 3. Trace the complete circulation of the blood.
> 4. What is saliva? The bile? The pancreatic juice?

[1] Averill, L. A. "Revitalizing the Rural School Curriculum." *Education*. January, 1920.

5. How long would the small intestine be if straightened out?
6. What are the seven tissues of the body?

At the close of the recitation the visitor marveled at the great proficiency of the class. He was convinced that every pupil knew the functions of the ductless glands, could differentiate between the systemic and the pulmonary circulation, knew the name and location of every bone in the body, understood the working of the valves of the heart, possessed a fair working knowledge of the several states in the digestion of food—in short, would do himself and his teacher credit if he were to matriculate at a medical college.

But how much is such knowledge worth to the pupil? How will it help him to live a more hygienic life? Evidently, more emphasis needs to be placed upon the evaluation of material.

Again, valuable time may be wasted by attempting to read material that is too difficult. It is a good rule to read only such material as one can understand and appreciate. An author's ideas are of no value to the reader unless he can understand them. One cannot "weigh and consider" material that is largely meaningless. To quote Noah Porter[1] again:

There is not a more silly spectacle often exhibited than that of an untrained or an uninstructed person professing to follow and enjoy a writer to whom he is unequal, looking wise over his philosophy, interested in

[1]Porter, Noah. *Books and Reading.* p. 54.

his narrative, or enraptured by his eloquence and poetry, when they are all Greek or Chinese to him.

This does not mean, however, that one should not read difficult material; only that he must, through a vigorous reaction, be able to understand and interpret the thoughts of the author. Obviously, one cannot judge the worth of material that he does not understand and it is a waste of time to repeat words to oneself if one is not able to judge of their meaning or value.

Furthermore, with the exception of a certain body of well-established facts and principles, there is not much that a competent or self-respecting reader can afford to accept without exercising his critical judgment to determine the validity of the material. Authors vary widely in their reliability, presenting in many fields markedly different points of view and not infrequently actually conflicting ideas. Some authors maintain a strictly scientific attitude, presenting facts and principles to support their conclusions, while others merely express opinions and prejudices, substituting these for reliable data. Of course, there is no harm in expressing opinions when proof is lacking but opinions must be recognized and rated as such.

In brief, if reading materials were arranged on a scale of values, they would range all the way from perfect reliability, or the highest degree, down to

zero; i. e., having no reliability at all. At the top of the scale would be placed axioms and well-established facts and principles; then in some order would come scientific treatises, statistical studies, textbooks, magazine articles of the better type (magazine articles of the lower order being mere expressions of opinions and prejudices), newspaper reports, political campaign propaganda or any sort of propaganda, advertisements of the extravagant sort, and weather forecasts of the popular almanac variety—the latter would be at zero or very near zero. The intelligent reader must learn to note the character of the material he is reading; whether it is a statement of facts or an advertisement of patent medicine; whether it is a scientific treatment of a problem or the expression of mere opinions and prejudices; whether it is a careful, thoughtful, and unbiased discussion of a public question or the generalities of a scheming office seeker. Thus one may judge the worth of material by observing its character and assigning it a place on a definite scale of values.

IV. Memorizing Material

1. The place and function of memory. Logically, memorizing follows the selection and organization of the valuable parts. Indeed, memory is but the continuation of the processes begun in the

selection and organization of the main points. Selection and organization bring the bonds up to a certain strength and memorizing provides for more exercise of these same bonds, thus bringing them to the point of effective functioning over a long period of time. Apparently, the real function of memorizing is not appreciated by many teachers. For a long time school work was largely an exercise of the verbal memory. Finally, there occurred a reaction against this inordinate use or abuse of the memory function. But, as usual, the reaction has swung to the other extreme and in school practice the memorizing of material is neglected. It is thought that pupils have done their full duty when they have reflected on a body of material. Both these extremes represent misdirected effort. Not *verbal memory*, not *thinking*, but *learning* is the business of the pupil, and learning frequently involves both thinking and memorizing. Forgotten ideas have little, if any, educational value. They cannot be used in solving problems or overcoming difficulties. Long ago William James remarked, "All the intellectual value for us of a state of mind depends upon our after memory of it." If this be true the pupil must do more than reflect upon material; he should make the ideas derived from this material a part of his intellectual equipment. Thus memorizing should be thought of as the

culmination of the process of assimilating ideas. To fail at this stage, as James pointed out, is to lose the fruits of our labor.

No attempt at memorizing should be made, however, until the worth of the material has been judged, for only the valuable parts should be memorized. First, the pupil should select, organize, and evaluate the material; then he should memorize the parts that he considers vital and essential. Furthermore, the pupil must learn to distinguish the data—that is, the supporting details—from the observations, inferences, and conclusions. Usually, it is only the observations, inferences, and conclusions that should be memorized. It is futile to try to memorize everything. Memory must be discriminative; it must distinguish the data, the supporting details, from the inferences and the conclusions.

2. Economy in memorizing. How to use the memory function most effectively is a problem of prime importance in assimilative thinking. What are the most economic methods of procedure in memorizing sense material? Fortunately, enough experimental work has been done to justify our belief in several rules or principles, particularly these:

1) *Reciting to oneself aids memorizing.* The

value of recitation in memorizing has been investigated by Gates,[1] Abbott, and others. In 1917 Gates published a monograph on "Recitation as a Factor in Memorizing," which included a summary of the work that had already been done in this field. From a critical review of the work of several investigators, he concludes that the preponderance of evidence in the case of the adults at least points to the effectiveness of recitation as compared to reading as a factor in learning. Gates himself made an extensive study of the problem: What are the relative values of learning by reading as compared to learning by recitation in case of school children working under school conditions and with the ordinary schoolroom methods of attack? He used as subjects the pupils of an elementary school in Oakland, California. For the tests with sense material, the third, fourth, fifth, sixth, and eighth grades were used - about forty-five pupils in each grade. These subjects, working in groups, devoted several periods to the study of brief biographies. In the study periods the relative amount of time given to recitation varied from 0% to 90%, as shown on page 301.

Table XX is typical of the results obtained. The scores are computed on a relative basis in which the average score for all methods equals 100.

[1] Gates, A. I. "Recitation as a Factor in Memorizing." *Archives of Psychology*. No. 40. New York.

Method	Reading	Recitation
1	100%	0%
2	80	20
3	60	40
4	40	60
5	20	80
6	10	90

Table XX. Showing the Average Percentile (Relative) Score for All Grades Combined (After Gates)

Method	1	2	3	4	5	6
Rel. Score	83.71	95.32	101.63	110.35	106.67	102.30
P. E.	1.64	0.99	1.26	1.90	1.01	0.74

On the basis of the foregoing table and much additional data Gates remarked:

We are safe in concluding then, that in general, Method One, which includes no recitation, is the poorest method, while Method Four or Five is the best. Method Two is considerably superior to Method One and Method Three is better than Two. That is to say, the best results are obtained when the recitation is introduced after one and one-half to three and one-half minutes of preliminary reading. Beginning earlier or later than this leads to poorer results.

In other words, the best results are obtained with

Method Four or Five in which 60% to 80% of the time is given to recitation or reciting to oneself. From this it follows that in memorizing one should spend more than half the time reciting to oneself.

2) *Memorize by the whole method rather than by the part method.* In employing the part method the pupil learns the material bit by bit, whereas by the whole method he reads the selection through from beginning to end each time until the learning is complete. For example, in committing to memory a sentence outline by the whole method the pupil would begin at the first and read through the outline to the end each time, repeating the process until all the points were memorized. By the part method he would learn the first point before beginning the second, the second before beginning the third, and so on to the end. Sometimes two or three points would be grouped and treated as a single unit or part.

The experimental data bearing on this point are more or less conflicting: generally the results are in favor of the whole method but in certain types of learning these favor learning in parts. Pyle and Snyder[1] made an investigation to determine the comparative merits of the two methods of learning poetry. The material used was Longfellow's translation of Dante's *Divine Comedy*.

[1]Pyle, W. H., and Snyder, J. C. *Journal of Educational Psychology.* II: 135-142. Warwick and York, Inc., Baltimore, Md.

which was entirely new to the learner. Unfortunately for the reliability of the data, only one subject was used in this experiment. Tests were made with material ranging in length from five lines to 240 lines. In every case two selections of equal length were memorized, one by each method, and the time was compared. In every instance the whole method proved to be superior to the part method, the saving of time being approximately 10% for the shorter selections and 20% for the longer selections.

Lakenan[1] with two subjects, herself and a university student, obtained mixed results for the two methods in memorizing poetry. The material consisted of unfamiliar passages from Byron's *Childe Harold*, varying in length from nine lines to twenty-seven lines. The same number of lines was memorized by each method until the lines could be repeated once without error and the number of repetitions was compared. Retention was measured by the saving method, that is, the number of repetitions saved in relearning the material. In the case of one subject the part method proved superior for the first learning of nine-line selections and also for retention, while the whole method proved superior for the longer selections. In the case of the other

[1] Lakenan, M. E. "The Whole and Part Method of Memorizing Poetry and Prose." *Journal of Educational Psychology*. IV: 189-198. Warwick and York, Inc., Baltimore, Md.

subject the part method proved superior in every instance for first learning. Retention after twenty-four hours, however, was better by the whole method for nine-line and twenty-seven line selections while the part method proved better for eighteen lines. After one year the whole method was decidedly superior.

When prose was memorized instead of poetry similar results were obtained. For first learning the advantage was in some instances in favor of the part method and in others in favor of the whole method, but relearning after several months showed in every case a saving in favor of the whole method.

From these data Lakenan concluded that, in general, the whole method is more economical for memorizing poetry and that prose is more readily learned and better retained by the whole method.

Pechstein[1] found the part method more economical for nonsense syllables and usually, though not in every case, in learning a maze.

In a more recent and more extensive study than any of the foregoing studies Reed[2] obtained results which he thinks favor the part method or the part-progressive method. In one experiment the part method proved to be superior to the whole method

[1]Pechstein, A. L. "Whole vs. Part Methods of Learning." *Journal of Educational Psychology.* IX: 381-387.

[2]Reed, H. B. "Part and Whole Methods of Learning." *Journal of Educational Psychology.* XV: 107-115; 592-595. Warwick and York, Inc., Baltimore, Md. 1924.

for both poetry and prose. But in a more extensive series of experiments, with a much larger number of subjects, the two methods approached equality as the intelligence of the subjects was equalized.

Reed concluded that the advantage of a particular method depends upon the individual learner. In one of his experiments 31 subjects found the part method superior; 56, the part-progressive; 26, the whole method. He ascribes the superiority of the part method largely to a better adaptation to the learner's memory span.

The writer has repeated several times Starch's experiment as outlined in his *Experiments in Educational Psychology*, using as subjects the members of his classes in elementary educational psychology. In every case the two methods proved to be practically equal for the two short selections of poetry.

On the whole the results from all the experiments are inconclusive. There is no decided advantage in favor of either method. The writer recommends the whole method because it is better adapted to the reading process and provides better for the organization of material and for spaced learning. Perhaps the best method is a combination of the part and whole methods.

3) Spaced reviews counteract forgetting. Investigations show that forgetting proceeds rapidly at first and then more slowly later on. Figure VII is a

typical curve of forgetting after Ebbinghaus. Similar results have been obtained by Bean,[1] Finkenbinder, and others. Bean in his monograph, "The Curve of Forgetting," states, "In brief, a survey of previous results as well as the results of the present study gives no warrant for altering the Ebbinghaus curve of forgetting or for introducing any other general type of curve alongside of that." This curve then, may be accepted as typical of all curves of forgetting. Bean concludes that the rate of forgetting is a variable quantity and that it depends, among other things, upon the degree to which the

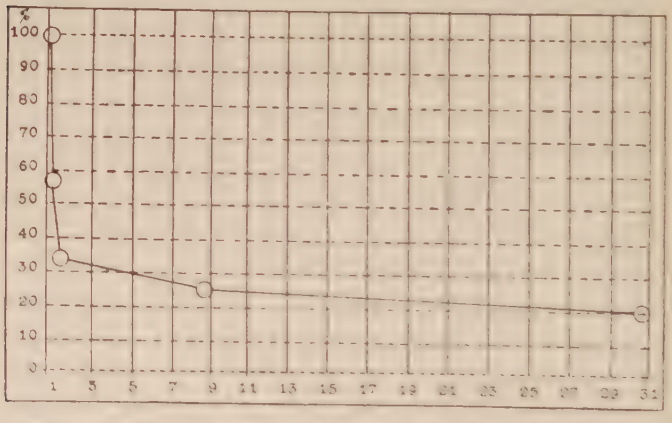

Figure VII. Curve of forgetting from the results of Ebbinghaus as reported by Bean, p. 2. The vertical scale represents the percentage remembered at each interval on the horizontal line.

[1]Bean, C. H. "The Curve of Forgetting." *Archives of Psychology*. No. 21. New York.

material has been learned and upon the distribution or concentration of learning.

4) Overlearning counteracts forgetting. Overlearning means learning beyond the point of one correct repetition. For example, in memorizing an outline the pupil should not consider the material learned when he is able to make one correct repetition; he should learn to the point of being able to make three or four correct repetitions. In brief, the pupil should do more than barely learn. He should learn thoroughly, for it has been found that overlearning material slows down the rate of forgetting. Ebbinghaus found that any study of material beyond the point of one correct repetition made it easier to relearn the material after a given interval. Bean summarizes his study of the forgetting of sensorimotor experiences as follows:

> The curve of forgetting has been determined for the complex associative performance of typewriting a specified list of letters or words. This curve has been found to have the same general character as that made familiar by the work of Ebbinghaus on much simpler performances; the similarity consists in a more rapid rate of forgetting soon after cessation of the learning than later. But the actual rate of forgetting has been found to depend very largely on the amount of learning preceding the period of forgetting. When the amount of learning is small the forgetting is at first rapid, but when the amount of learning is greater the forgetting

starts at a much lower pace than is shown in the Ebbinghaus curve. In the latter case the rate of forgetting is not excessively rapid at first and, though it decreases, it decreases more slowly than in the usual curve.

Bean's conclusions are drawn from a study of sensori-motor learning but it is probable that the same is true of rational learning. The greater the amount of exercise under favorable conditions, the greater will be the strength of the bonds formed; the greater the strength of the bonds, the more slowly they will deteriorate with disuse.

V. Use, or Application, of Ideas

Although memorizing may be said to be the final stage in the assimilation of ideas their real value is to be found in their application to life situations. The function of ideas is to guide the individual in his reactions to situations for which his instinctive and habitual modes of reaction are inadequate and unsatisfactory. Indeed, ideas are never real ideas until they are tested out in genuine life situations. One can learn thoroughly only by doing. The real meaning of the Golden Rule can never be known by the thief, the swindler, or the profiteer. Likewise, any idea or principle must be applied before its true significance can be grasped.

But the reader should guard against interpreting the use of ideas in the restricted sense of applica-

tion to vocational activities, to making a living. Ideas may be used not only to make a living but also in living. Knowledge is being used whenever it functions in guiding the individual's reaction to any phase of his environment: physical, vocational, social, or religious.

The meaning of the use of ideas may be illustrated by reference to the study of school subjects. In the study of physiology and hygiene, for example, the emphasis may be placed upon memorizing the text or upon hygienic living. In the schools of a generation ago the common practice was to memorize the text and leave application to its own fate. Among other things the pupil memorized the ten laws of health—and didn't practice them One of these laws is, "Breathe pure air." The pupil memorized this law and recited it to the teacher; then he went home and closed all the doors and windows of his bedroom to keep out the night air. The nearest approach to application was a formal memorizing and reciting of the results of breathing impure air. Usually the statements were but vaguely comprehended and quickly forgotten. The latter is, of course, the natural result of the failure to use ideas, for the pupil will eventually lose what he does not use.

On the other hand the modern school places the emphasis upon hygienic living. Credit may be given

for sleeping with the bedroom windows open, cleaning the teeth, and other hygienic habits. Thus the application to hygienic living is the goal or objective in the acquisition of ideas in physiology and hygiene; this is what is meant by the use, or application, of ideas.

Again, in arithmetic the objective of the old-time school was the ability to solve the problems in the book. It was seldom that any application was made to life situations. For example, the writer once knew a class of boys above the average in ability that had learned so thoroughly how to find the cubic contents of a bin that they could do the book examples with ease and to the entire satisfaction of the teacher, who was considered a good mathematician. No attempt was made, however, to apply this principle to practical situations. Now it happened that when these boys were on their way home from school a farmer asked them to find how many bushels of corn his sled box would hold and strange to say, not one of the half dozen boys could solve this problem. They had the book knowledge of the method of finding the cubic contents of a bin and they knew the number of cubic inches in a bushel, but they did not know how to apply the knowledge to a practical problem. They were helpless because they had not learned to apply their knowledge to the problems of real life. Of course,

the modern school makes the solution of practical problems the main objective, teaching the principles as they are needed in solutions. In other words the modern school places due emphasis upon the application of ideas to life situations.

As in hygiene and arithmetic so in all school subjects ideas must be applied to life situations. Mere intellectual comprehension of ideas in the abstract has but little value. Ideas obtained from reading are valuable to the extent that the reader uses them to adjust himself to some life situation; this is what is meant by the application, or use, of ideas.

VI. Summary

The main factors of assimilative thinking, or reflective reading, are:

1. *Specific aims or purposes.* Great men waste no time in aimless reading and we should do well to follow their example. Experimental investigations show that an attentive, problem-solving attitude makes for rapid learning. The pupil sees what he is looking for when he reads and not much more.

2. *The selection and organization of the main points.* On the basis of specific aims related to the life of the pupil he should select and organize the main points in his reading. The arrangement of the points should show their relation to the aim, or problem, and to one another.

3. *Judging the worth of material.* Time may be wasted in reading material of little value or in attempting to

read material too difficult for the reader. First of all judgment must be used in selecting the material in order that one may read with profit. Again, there is not much reading material that one can afford to accept without critical evaluation. The reader must learn to evaluate material by observing its character and assigning it a place on a definite scale of values.

4. Memorizing material. Logically, memory follows the selection, organization, and evaluation of ideas, for only the valuable parts should be memorized. Memory must be discriminative, distinguishing the data from the inferences and conclusions. The following rules or principles make for economy in memorizing:

1) Reciting to oneself aids memorizing.
2) Better results are usually obtained by the whole method than the part method.
3) Spaced reviews and overlearning counteract forgetting.

5. Using, or applying, ideas. Any idea or principle must be applied before its real significance can be grasped. Knowledge is being used whenever it functions in guiding the individual's reactions to any phase of his environment. Ideas obtained from reading are valuable to the extent to which the reader uses them to adjust himself to life situations. Use, or application, is therefore the ultimate objective in reading.

CLASS EXERCISES

1. What are the chief factors in the reading process? Compare the statements from McMurry, Parker, Lyman, and Thorndike. See the references for additional material.

2. Cite evidence to show that a specific aim or problem is one of the chief factors in the reading process.

3. Is it worth while to read a book or article without a specific aim? Can one read without an aim or problem?

4. What is the proper basis for the selection and organization of ideas?

5. Select and organize the main points in some chapter or article; as, for example, McMurry's chapter on specific aims as a factor in study.

6. Cite evidence to show that it is necessary to use one's judgment in reading.

7. By what standards should the worth of an idea be judged?

8. Does the modern school have too much or too little memorizing?

9. How can the memory function be used most effectively? Formulate the principles of economy in memorizing.

10. How can the pupil learn not to forget? Or, how can learning be made permanent?

11. What is meant by the use, or application, of ideas?

12. What is the objective in the study of language and grammar? Arithmetic? History? Civics? Geography?

13. Summarize the main points in this chapter.

14. Read one or more of the references for this chapter, applying the ideas set forth in the chapter.

REFERENCES FOR CLASS USE

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of study with quotations from McMurry, Foster, and Lockwood. Chapter IV is a valuable discussion of reflective reading, with quotations from Richardson and E. B. Bryan.)

9. McMurry, F. M. *How to Study and Teaching How to Study.* Chaps. III-VIII. New York: Houghton Mifflin Company. 1909.

(The standard work on how to study, particularly study of the reading type. Should be read by every student. Has a chapter on each of the main factors of assimilative thinking.)

10. Sandwick, R. L. *How to Study and What to Study.* Part I. New York: D. C. Heath and Company. 1916.

(A discussion of the principles of effective study. Each chapter closes with a summary of the main points in the form of definite rules to guide the student. Chapter IV on studying aloud is of doubtful value.)

11. Swain, G. F. *How to Study.* New York: McGraw-Hill Book Company. 1917.

(A discussion of how to investigate a problem. Offers many good suggestions to the student.)

12. Whipple, G. M. *How to Study Effectively.* Bloomington, Ill.: Public School Publishing Company. 1916.

(Contains thirty-eight specific rules for study with a brief explanation of each rule. A good summary of the principles of effective study.)

CHAPTER VIII

SUPERVISING ASSIMILATIVE THINKING

Questions to Be Kept in Mind When Reading

1. How can primary pupils be trained to read well?
2. In teaching the thought subjects, how can the teacher provide for the main factors of assimilative thinking?
3. How can the results of this type of work be checked up frequently?
4. How can the main factors of assimilative thinking be provided for in history, civics, hygiene, geography, and other thought subjects?

No attempt is made to include all the principles and devices that should be employed in teaching beginners to read. An abundance of such material is now available in the teachers' manuals accompanying the modern sets of school readers and in the special methods of teaching reading prepared by experts in this field. This chapter is devoted to the problem of teaching pupils how to read from the viewpoint of thought getting.

I. The Primary Department

In the lower grades assimilative thinking appears particularly in the form of silent reading. This

subject will be treated therefore as typical of assimilative thinking in the primary department.

The older methods of teaching beginners to read were formal and synthetic. They began with letters or sounds of letters and combined these to form syllables, words, phrases, and sentences The emphasis was on form rather than on content. The more recent methods are, however, subordinating form to content. It is now generally agreed that from the very beginning reading should be a process of thought getting. What, then, can the teacher do to aid the pupils to assimilate more economically ideas from the printed page? Primary pupils would not profit much from formal instruction in the proper methods of reading but their work can be directed so skilfully that they will unconsciously build up right habits of study. To this end the chief factors of assimilative thinking should from the first be provided for in directing the pupils' reading exercises. How this may be done is discussed in the following paragraphs.

1. **Finding the heart of the story.** If a selection has a central idea—and many have—as its organizing principle, the pupil should be taught to find this central idea and to group all the other ideas around this common center. Otherwise, he will not be able to master the thought of his lesson. Frequently, the title of the poem or story gives

the clue to the central theme. With this clue in mind the pupil should go in quest of the main idea. For example, in "The Ugly Duckling" the title suggests the central theme. The pupil should read the story to find out why the duckling was called *ugly* and what happened to him because of his ugliness. The pupil will thus be able to make his way into the heart of the story. If the title gives no clue to the meaning the teacher can stimulate and direct the child's thinking by proposing a few good questions for consideration and discussion. For example, in "The Fox Who Lost His Tail" why did this fox wish the other foxes to cut off their tails? What did they think of the plan? Why did they reject it? Why do boys and girls play tricks on one another? By following this method the pupil can be led to think from the very beginning and to assume the problem-solving attitude toward his reading material—in other words, to read with specific aims.

2. Finding the main divisions of a selection. Too often teachers make the sentence the unit of progress in reading. All too frequently one hears such directions as: "Read the next sentence and tell me what the hen said. Read the next sentence and tell me what the bird said to Betty." Thus the sentence is made the unit of advance in reading. There is, however, at the present time a strong

tendency to make large units the basis of instruction in reading. Recent writers on methods of teaching primary reading are emphasizing the idea of larger units. On this point Frances Jenkins[1] writes:

> Our primers and first readers are being printed now with this idea of larger units as a basis. The section which tells of the squirrel's experience is separated from that which tells of the rabbit's experience. This makes it easier for the child to grasp the larger unit of thought as he reads. Where the printing does not suggest this division the teacher may train herself to have sentences which belong together read together.
>
> A second-grade class was reading the life of a little Eskimo girl. The section dealt with her playthings. "You may read all about one plaything," the teacher directed. Only two children in the group were able to do this without help but every child was able to pass judgment as to whether the others read far enough or too far. After a few months of such training a class reaches the point where, when a child is called upon to read, the teacher will ask, "How far will you read?" "I shall read how the pine tree felt when it was very little," will be the response; or, "I shall read to the place where Hans saw the man trotting along on a horse."

Similar views are expressed by other writers on the teaching of reading. Of course, the pupil must begin his reading with small units but these units should be gradually increased until the pupil can

[1] Jenkins, Frances. *Reading in the Primary Grades.* pp. 15, 16. Used by permission of, and arrangement with, Houghton Mifflin Company, the authorized publishers, New York.

readily divide a whole story into its main divisions. By the time a pupil is in the second or third grade he should be able to make the paragraph the unit of thought, and in the fourth and fifth grades he should be able to group paragraphs into sections.

As the pupils make progress in finding the main divisions of a selection they should be taught devices for indicating these divisions. They may make a simple outline or they may indicate the beginning and the end of each division. Enough of this type of work should be done to establish firmly the habit of grasping the larger units of thought and relating these to one another. Thus habits of selecting and organizing the main points may be established.

3. Memorizing selections. Usually the child is required to memorize a few selections each school year. When memorizing is required the pupil should be taught the most economical methods. Conscious attempts at memorizing should follow these steps: (1) finding the central idea and (2) locating the main divisions of a selection. In many cases nothing further will be required than the two steps. In cases of verbatim memorizing usually the whole method is superior to the part method for the reason that the connections of the several parts are better established. Perhaps the best method is a combination of the two in which the whole method is made the basis

of the learning and the part method is applied to the learning of the more difficult lines.

Again, the teacher should have the pupils carry the learning of all selections beyond the point of first recall, for material barely learned is soon forgotten. Furthermore, she should provide for several repetitions, with increasing intervals, of all material that she wants the pupils to retain permanently. For example, poems that are to be memorized should be repeated several times during the year. The intervals between repetitions should be short at first and then gradually lengthened.

4. The use or application of ideas. The real measure of a pupil's learning is the extent to which his behavior is modified. Ideas are never fully grasped and evaluated until they are applied to life situations. Pragmatism, which counts among its exponents some of the leading thinkers of the world, tells us that true ideas are those that we can assimilate, validate, corroborate, and verify, while false ideas are those that do not make any concrete difference in one's actual life. A part of the class period, therefore, may well be devoted to a discussion of the use that can be made of ideas.

If the class is reading "The Dog in the Manger" the pupils should be led to see not only how the dog was selfish but also some of the common ways in which a child may be selfish; how he may be, as it

were, a dog in the manger. Thus the idea may be verified and validated. Similarly, in all selections the application of the ideas should engage the attention of the class. The older writers overworked this idea by attaching a moral to every tale but some of the modern writers are going to the opposite extreme, urging that the teacher should not moralize and that no application should be attempted. Let the pupil make his own application, they advise. These writers, however, commit what James has called the "sentimentalist fallacy." They shed tears over abstract justice, generosity, and beauty but never know these qualities when they meet them in the street, because circumstances may make them seem vulgar. Moreover, it is a fact of common observation that the pupil fails to apply much of what he learns abstractly in the schoolroom. He needs to be stimulated and guided in the application of ideas to life situations as well as in comprehending them abstractly.

Summary of section. What can the teacher do in supervising the assimilative thinking of primary pupils?

1. The teacher can train the pupil to find the central idea or theme of a selection, to read with specific aims.

2. She can (1) teach the pupil to locate the main divisions of a poem or story; (2) give some devices for indicating these divisions; and (3) show how to select and organize ideas.

3. She can teach the pupils the best methods of memorizing material, providing for overlearning and for spaced repetitions.

4. She should teach him to interpret material in terms of life situations, to validate and verify ideas by using them.

5. Beginning not later than the third grade the teacher should check up on the pupil's progress by the standard scales, diagnose his reading ability, and apply remedial measures according to his needs. How this may be done is demonstrated in experiment 3, reported in chapter XIII.

II. Upper Grades and High School

In the upper grades and high school the factors of assimilative thinking should be emphasized in all textbook work. Effective supervision of this type of work requires: (1) that the teacher have a good working knowledge of the chief factors of assimilative thinking as set forth in the previous chapter; (2) that she find out just what her pupils do in preparing a textbook lesson; and (3) that she fit her instruction in methods of study to the needs of the class. In directing the assimilative thinking of the pupils the following points may need to be considered.

1. How to discover the author's aim. Many authors, failing to appreciate the value of specific aims to the reader, begin writing without first stating what they are writing about. Usually they reveal

their aims more or less clearly as they proceed but the pupils need to be taught how to discover aims without waste of time and energy. Consequently, the following points should be made clear:

1) In beginning the reading of a book one should look for a statement of the aim in the preface or introduction. The preface usually states the aim and sets forth the viewpoint of the author, outlining briefly the method of treatment. For example, in the preface to *Educational Psychology* Starch[1] states:

> The preparation of this book has been carried out according to two fundamental purposes: First, to present that material which seems to be most useful and relevant to the problems of educational psychology; and second, to maintain a strictly experimental, scientific viewpoint in discussing these problems.

Similarly, in the preface to *The Reading Process*, Smith[2] writes:

> This book is not primarily a treatise on methods of teaching reading. It concerns itself rather with the principles which underlie method. Its chief aim is to furnish a body of information—psychological, philological, and experimental—which will enable the teacher to develop and use methods intelligently in place of

[1] From Starch, Daniel. *Educational Psychology*. Preface. By permission of The Macmillan Company, publishers, New York. 1910.

[2] From Smith, W. A. *The Reading Process*. Preface. By permission of The Macmillan Company, publishers, New York.

accepting them blindly and following them slavishly.

Illustrations of this point could be multiplied indefinitely. Obviously, a study of the preface enables one to get his bearings at the outset and pupils should be taught to avail themselves of this advantage.

2) Sometimes the specific aim of each chapter is stated in an introductory paragraph. This is rather unusual, however, for authors commonly launch into a discussion with only a title or topic to suggest what they are writing about. Nevertheless, the pupil should be taught to look for a statement of the specific aim in an introductory paragraph to each chapter.

3) In short articles the aim is commonly stated in an introductory paragraph or put in the form of a question in the title. For example, in the July, 1923, number of the *American Magazine*, H. I. Phillips heads his jocular article on the status of women, "The Weaker Sex—Which?" In reading magazines, then, the pupil should be taught to look in the title or in an introductory paragraph for the aim.

4) In most textbooks the specific aims are suggested in the titles of chapters and in paragraph and sectional headings. Consequently, pupils should be taught to discover and formulate specific aims by surveying quickly the chapter headings and paragraph and sectional topics.

5) As a last resort the pupil should be taught to read the material once to discover the aim of the writer. This procedure will be less wasteful than aimless reading.

2. How to use the aim. It is not enough to discover the aim: it must be put to work to guide the pupil in the further study of the material. The question raised is, What use should the pupil make of specific aims in his study?

1) *The pupil should definitely formulate the aim as a specific problem to be solved through a study of the material of the chapter or a lesson.* This problem should direct and control all the pupil's reactions to the material. For example, if a pupil is studying the causes of the Civil War he should state the aim as a problem or question: What were the causes of the Civil War? Then he should proceed to investigate these causes and evaluate and list them in the order of their importance. Thus he is trained to formulate definite aims to guide him in his study.

2) *The pupil should be taught to keep the aim constantly in view.* There is a strong tendency to wander far afield and to read with diffused attention, to lose sight of the goal. Even teachers in round-table discussions frequently forget what they set out to talk about, wandering far from the subject. If they have a definite problem before them

for discussion, the first speaker will talk more or less to the point—not infrequently less. But the second speaker may branch off on a remotely related topic in which he happens to be interested and the third speaker will, in all probability, discuss fervently an entirely different topic. Obviously, both teachers and pupils need to be trained to keep the goal in view, to use specific aims more effectively. Pupils should be taught to follow up their aims until the work is completed or until they have collected and evaluated all the available material. Furthermore, specific aims provide a proper basis for the selection and organization of ideas.

3. How to select and organize the main points. The pupils should be given an abundance of practice in selecting and organizing the main points in reading material. In assigning work of this type the teacher should give definite directions, indicating what the pupils are to do and how they are to proceed until they have acquired some facility in the work. The following methods and devices should be used:

1) Read the selection once to determine what points the author has made that have an important bearing on the aim. Select and mark or list the important points.

2) Make a summary of the main points in the material.

This may be carefully written out in a compact paragraph or in outline form.

3) Make a sentence outline of the material, showing the main and minor points by a system of numbering and spacing.

4) Formulate a set of questions covering the main points.

5) After the pupils have had considerable practice in summarizing and outlining material they may be taught to mark their books to make the important points stand out clearly. This may be done by placing on the margins numbers and topical headings and by underscoring the sentences that state the main points most clearly.

6) Argument may be condensed into briefs including references to the materials that support each point.

The way to summarize and outline has been illustrated in the preceding chapter in the section on the selection and organization of ideas and need not be repeated in this connection. The foregoing devices should be varied frequently to avoid boredom and monotony and not more than one or two need be employed at any one time. Work of this type should be continued, however, until the pupils become skilled in selecting and organizing the important points in their reading material.

4. How to judge the worth of ideas. On this point the pupils should have effective guidance, for judging is a process of evaluating several factors, some of which may be variable, obscure, or elusive.

Moreover, ability to judge wisely can be acquired only through much practice under effective guidance and through a wide experience with the factors to be evaluated. The following points should receive careful consideration.

1) *Teach the pupil to evaluate material in the light of the aim.* The reader should be asking continually: What bearing does this statement have on the aim or problem? Or, How are these data related to the problem? A point is valuable to the extent that it contributes to the solution of the problem under investigation or to the extent that it is related to the specific aim of the writer. Relevant points are valuable; irrelevant points are valueless. From this viewpoint worth is measured by the degree of relevancy.

2) *Teach the pupil to weigh relative values.* The proper organization of material requires the pupil to distinguish between the main and the minor points. This distinction involves the weighing of relative values. Each point must be evaluated in the light of the aim and placed in a system of coördinate and subordinate points. In making a sentence outline the pupil must distinguish between the main and the minor points. This type of judgment is an essential phase of the selection and organization of ideas.

3) *Teach the pupil to observe whether the author's*

conclusions are based upon reliable data or upon mere opinions and prejudices. Some authors maintain a strictly scientific attitude, basing their conclusions upon the most reliable data available while others have nothing to offer but their own opinions and prejudices. The pupil should be trained to note what evidence, proof, or data the author presents in his treatment of an aim or problem. Opinions and prejudices rank very low in the scale of values, whereas sound conclusions from reliable data must be accepted as valid.

4) *Test the facts and conclusions in the light of observation and experimentation.* Facts are valuable to the extent in which they help in the solution of one's problems; conclusions are valuable to the extent in which they explain and control facts. Frequently, conclusions can be tested by the experimental method. For example, the pupil can determine for himself whether the whole or part method of memorizing is the more economical procedure for him in memorizing various kinds of material. Similarly, other conclusions may be accepted or rejected on the basis of experimentation but the pupil must be taught the proper method of procedure in conducting experiments. Experiments are worthless unless they are conducted according to strictly scientific methods. Again, facts may be evaluated in the light of one's own observations.

If an author states that acquiring the drug habit is one of the grave dangers of the use of patent medicines, one can judge the truth of this statement in the light of his own observations. Care must be taken, however, to avoid generalizing from meager data. Only tentative conclusions may be drawn from casual observations or isolated cases. To be accepted as valid conclusions must be supported by an abundance of reliable data.

5) *Ideas may be evaluated by an appeal to authority.* The reputation of the author may be investigated and his views compared with the views of the recognized authorities in the same field. This will cultivate a wholesome respect for the leading thinkers in the various fields of human endeavor. If the author has an established reputation as a careful thinker and his conclusions agree fairly well with other eminent authorities in the same field, his statements may be accepted as representing the present state of knowledge in that field. Of course, the pupil should assume a tentative attitude toward all knowledge accepted on authority and be ready at any time to modify his ideas in the light of new knowledge that may become available. Again, a man should be regarded as an authority only in his own field. It is hazardous to accept a statesman as an authority on a scientific problem or a scientist on a question of law or religion. There

is a tendency to carry the weight of authority into foreign fields. The pupil should be admonished to bear in mind that a distinguished man is usually not an authority in general but an authority in some particular field.

6) *Facts should be evaluated on the basis of their relation to life.* The pupil should be led to see that facts closely related to life are worth much more than facts only remotely related to life. Facts pertaining to health, for example, are worth immeasurably more than facts pertaining to a foreign language which the child may never be able to use in any practical way. Pupils should have constant practice in evaluating materials on the basis of their use in real life situations. Frequently, children ask, "What is the use of studying this subject?" This question merits careful consideration. The teacher should help the pupils discover the practical applications of the subject, to see how it will help them to adjust themselves to life situations. The more closely the subject matter is related to life, the greater its value. Moreover, pupils cannot afford to waste time on material only remotely related to life. There is an abundance of valuable material to engage their attention. Teachers should cultivate a fine sense of values and stimulate and guide the pupils in the exercise of this type of judgment.

7) *Teach the pupils to use a rating scale to determine the reliability of material.* This type of work would be too difficult for primary pupils but the more advanced pupils could construct a tentative scale that would tend to make their judgments more accurate and less variable. The scale should consist of materials extending over the whole range of reliability from the highest to the lowest, the points on the scale being determined by the consensus of opinion of the class. The following scale is merely suggestive:

10. Well-established scientific facts and principles
8. Experimental studies scientifically conducted
6. Textbooks written by recognized authorities
4. Discussions based upon mere opinions and prejudices
2. Political campaign propaganda
0. Patent medicine testimonials

The points on this scale may be displaced more or less, but the use of such a scale would tend to make the pupil's judgment more accurate and to bring out clearly the fact that materials vary widely in reliability. On this scale textbooks would be rated at 6; mere opinions and prejudices at 4; and an experimental study at 8. Thus any reading material may be placed on the scale and given its proper numerical value. Such a scale should be regarded, however, merely as a device for getting

pupils to exercise more accurate judgments and not a scientific instrument for measuring the reliability of material.

5. **How to memorize.** Memorizing is provided for largely in the selection and organization of important points. The making of a sentence outline, for example, establishes the proper thought connections among the ideas to be memorized but more exercise may be needed to bring these bonds to their full strength, to insure that they will function effectively over a long period of time. The teaching of economical methods of memorizing, therefore, constitutes a part of the pupil's training in effective methods of studying. The following points should be made clear to the pupils.

1) *Reciting to oneself aids memorizing.* Approximately one half of the time may well be spent in reciting. After a few minutes of preliminary reading the pupil should recite to himself as much as he can, looking at the material to prompt himself when he is unable to proceed from memory. This applies particularly to verbatim memorizing but is valuable in any kind of memory work. When the aim is to fix in mind the main points the pupil should review or summarize the material without looking at the book except to prompt himself when he is unable to recall the main points. He should be taught how to use this principle in his study and

be closely supervised until proper habits are established.

2) *Teach the pupil the proper use of the whole and part methods of memorizing.* The experimental results, for the most part, favor the whole method but it is by no means certain that the whole method is always superior to the part method. Perhaps the best method is a combination of the two, making the whole method the basis of the work and supplementing it with the part method at difficult points. The whole method provides better for the thought connections but it is a waste of time to repeat a long selection several times in order to learn a few difficult lines. It is better to learn the difficult lines by the part method and then return to the whole method. It should be noted, however, that learning by the whole method has been found to be more permanent than learning by the part method. This is a strong point in favor of the whole method, for we want the pupil to retain what he learns. Teach the pupil, then, to make the whole method the basis of his memorizing, using the part method to master troublesome passages.

3) *Teach the pupil how to counteract forgetting.* Ordinarily, in the course of a few days forgetting robs the pupil of from one half to three fourths of his acquisition. How often the teacher is surprised to find that the pupils do not know today what

they learned yesterday! How can this rapid forgetting be counteracted? How can the pupil learn to remember?

First, the rate of forgetting depends, in part, on the degree of learning, or the thoroughness with which the material has been learned. It has been found that thorough learning slows down the rate of forgetting. Overlearning, or learning thoroughly, is therefore economical. Too often the pupil thinks his work is complete when he is able to make one correct repetition of the material or when he has only vague ideas and hazy imagery. But to stop at this point is to invite rapid forgetting. The pupil should be taught to learn to the point of two or three correct repetitions in verbatim memorizing and to continue his study, when the aim is to master the main points, until his ideas are clear and well organized.

Second, spaced reviews counteract forgetting. One who is familiar with the curve of forgetting does not expect learning to be permanent without several repetitions. These repetitions should be distributed with increasing intervals. Perhaps the first two or three should be separated by approximately daily intervals; then the intervals should be increased to a week and later to a month or longer. Four or five repetitions, properly spaced, will do much to counteract forgetting. Each repetition

brings the bonds back to a state of effective functioning until finally there is little if any forgetting. In directing the work of a group of pupils, then, two or three repetitions should be provided for in the class periods, followed by other repetitions separated by weekly and monthly intervals. Pupils should be taught to review in their daily study periods. As a general rule a part of every study period should be spent in reviewing. These reviews should cover the work of the previous day and occasionally reach back for a week or a month—even for all the earlier work of the term. Reviews are to assimilative thinking what drill is to habit forming. Repetitions should not cease until the material has become a permanent acquisition.

But the teacher should understand that a review does not mean mere monotonous repetition. It should mean the study of old and familiar topics from a new point of view. Preparation for advance work, linking the new to the old, and comparison provide excellent opportunities for review. Thus the earlier topics may be brought into significant relationships with the present topics

6. How to use ideas. Ideas are learned, not to be buried in some neglected mental graveyard but to be used in adjusting oneself to real life situations. Moreover, ideas are never completely assimilated until they find expression through the appro-

priate channels of real life. In other words application is an essential part of the learning process. One may understand a principle in its connection with abstract and artificial cases and not know how to apply it in real life. The illustration given in the previous chapter of the boys who knew how to find the cubic contents of a bin but could not find how many bushels a sled box would hold is a case in point. How were they to know that a sled box is a bin! They failed, not because they did not know the principle that applied to that situation but because they did not know that the principle applied then and there. In short, they had failed to complete the learning process through application of the principle to several life situations. But how can application be given its proper place in directing learning? Note the following suggestions.

1) *Eliminate all subject matter that is only remotely related to life.* Teach the ideas that have a direct bearing on the present life of the pupil. In physiology and hygiene, for example, first teach healthful living and then teach physiology. In the language subjects stress effective speaking and writing particularly. Similarly, in all the other subjects teach the ideas of practical import, the ideas that will help the child solve the problems of his daily life. Reading material that is abstract, condensed, dry, and dead should have no place in the school

curriculum. Use only thought-provoking, gripping, vital material, the topics that reach out into hygienic, social, and civic problems of vital concern.

2) *Teach the pupil to organize his ideas around specific aims growing out of his own experiences.* Work of this type gives promise of some practical outcome because the ideas are definitely related to life situations. If a pupil has collected and organized a group of ideas around some practical problem, such as canning fruit or growing potatoes, these ideas in all probability will be available for use in any similar situation that may arise in the future. Pupils should be taught how to read in order that they may get help in solving the problems which grow naturally out of the give and take experience.

3) *In the recitation give due emphasis to the use, or application, of facts and principles.* The full significance of facts and principles can be grasped only in the light of their application. The learning process is never complete until the ideas take effect in modifying the learner's conduct in appropriate ways. *Stimulus-bond-response* is the fundamental formula of all learning. Making the proper response to a stimulus is essentially what is meant by application. Frequently, teaching fails to establish the right bonds between ideas and their application. For example, the teacher may teach that breathing

pure air is essential to health and at the same time fail to lead the pupils to see that they should sleep with their bedroom windows open. But such teaching is ineffective. In real teaching, connections are established not only with the artificial situations of the schoolroom but also with practical life situations. In brief, a liberal amount of the recitation should be devoted to a consideration of the use of ideas, that is, to tracing out their application, for application is a vital phase of the learning process.

4) *Teach the pupils to use their own experiences in attacking problems.* In many instances the pupil already has in his possession all the facts and principles necessary to enable him to solve a problem but he neglects these and turns to his teacher or to a book for suggestions. This is just the opposite of what he should do. First, the pupil should recall his own experiences, then, if necessary, he should supplement these with material from books or any other available source.

7. Check up accurately on results. The teacher should check up accurately on the progress of the class and keep each pupil informed of his standing in the class. The importance of the accurate checking of results has been emphasized in connection with simple associative learning. Doubtless, this factor is equally important in assimilative thinking. Accurate checking of results helps to

motivate the work and to create an interest in improvement. How, then, can results be checked up accurately in assimilative thinking? Means of checking this type of work are available in two forms at least; namely, standard scales and tests improvised by the teacher.

1) *Standard scales.* Standard scales are now available for measuring results in history and geography and, at the present rate of scale production, similar scales will soon be available in all the thought subjects. Some of these scales provide for several tests without repetition, thus lending themselves readily to the frequent checking of results. For example, several tests may be made up from the Hahn-Lackey Geography Scale and given at stated intervals throughout the year. Likewise, Starch's American History Test is available in different forms; the same is true of a number of other tests. A discussion in this connection of these tests and their uses would be superfluous, however, in view of the recent books in this field.

2) *The teacher's own devices.* The resourceful teacher can devise tests for the frequent checking of results. With these tests the progress of the class may be checked as often as desired. Of course, in such tests it is not the student's absolute score that is significant but his rank in the class. Some teachers give these informal tests frequently, grading

and ranking the pupils on a point scale. Any convenient number of points may be used, as 30 or 40. A small number of points makes computation easier but there should be enough points to distribute conveniently among a half dozen questions. A time limit should be imposed in giving these tests, usually ten to twenty minutes. The questions should require the reproduction of important points and should be stated so that the responses can be graded with a fair degree of accuracy. Indefinite, general, or ambiguous questions are of little value in checking accurately the work of a class. The questions should be weighed according to their difficulty as determined by the teacher's judgment and the total number of points should be the same for all the tests so that scores will be comparable. The foregoing points apply particularly to the familiar essay type of examination but the teacher should learn how to administer the newer tests: the true-false test, the completion test, and the best answer test.

The *true-false test* is a convenient device for the rapid checking of results. This test consists of a number of statements some of which are true and others false.

True-False Test

Bourne and Benton's *History of the United States*
Chapter XII

Some of the following statements are true and some are false. If a statement is true, draw a line under *True;*

if it is false, draw a line under *False*. Do this for every statement. If you are not sure, guess at the right response.

Topic: How the Colonists Lived
(Later Colonial Period)

1.	All the colonists lived in fine homes.	True	False
2.	New York was the largest city.	True	False
3.	Rice and cotton were grown in the south.	True	False
4.	Only a few of the colonists were farmers or planters.	True	False
5.	The English Parliament forbade shoes to be sent from one colony to another.	True	False
6.	Public schools in the colonies were for boys only.	True	False
7.	The main purpose of the college was to train clergymen.	True	False
8.	The colonists printed most of their own books.	True	False
9.	Newspapers were rare and expensive.	True	False
10.	Belief in witchcraft was common among the colonists.	True	False
11.	There was no one language widely used among the colonists.	True	False
12.	Shells, tobacco, and other commodities were used as money.	True	False
13.	Matches were in common use in colonial days.	True	False
14.	The farmer's house was a workshop.	True	False

15. Horse racing and fox hunting were popular amusements. True False

Any convenient number of statements may be used. The preceding test may be graded on the basis of 15 or 30 points for a perfect score or any multiple of 15 may be used. The pupil's score is the number of right answers minus the number of wrong answers, no account being taken of omissions. For example, if 30 points is allowed for a perfect score and a pupil's record is 12 right, 2 wrong, and 1 omitted, his score would be 24 minus 4, or 20. (Of course, each statement counts 2 points with 30 points as the perfect score.)

In selecting statements for a true-false test the teacher should observe the following points:

1. The true and false statements should be approximately equal in number. If a teacher repeatedly includes more true than false statements clever pupils will discover that they can make higher scores by guessing *True* whenever they need to guess. The reverse is true if more false statements are used.

2. Select statements that are clear and definite and about which there is no room for difference of opinion. If it is merely a matter of opinion the pupil's opinion may be as good as the teacher's. At any rate the pupil will be—and may well be—dissatisfied with the teacher's arbitrary ruling. If a dispute arises the textbook may be taken as the standard of truth or falsity; that is,

what the text states is accepted as true for the purpose of the test.

3. Include only important statements. This will encourage the pupils to center their attention on the important points when they are studying and will cultivate a sense of relative values.

4. Make the statements brief, clear, and concise. Long and involved sentences have no place in the true-false test. Brevity is particularly desirable when the test is given orally, that is, when the teacher reads the statements, requiring the pupils to write down the number of each statement and indicate whether it is true or false.

The best way to conduct a true-false test is to place duplicate or mimeographed copies in the hands of the pupils and require them to indicate which statements are true and which are false. The time limit should be just long enough to permit the brighter pupils to complete the test. This plan, however, would require too much clerical work on the part of the teacher unless she has access to a duplicating machine. The most convenient way is to number the statements, read them to the pupils, and require them to write the numbers, indicating in each case whether the statement is true or false.

One advantage of the true-false test is that it can be scored accurately and with a minimum amount of labor. Two or more teachers grading the same paper obtain the same score whereas wide varia-

tions are usually found in marking written tests. The true-false test papers can be scored more rapidly than the older form of test papers. Then, too, the labor of scoring papers can be still further reduced by having the pupils exchange papers and check their own errors in class. Another distinct advantage of the true-false test is that it checks more points in a given amount of time. It covers more ground than the essay type of examination.

The *best-answer test* requires the pupil to select the best answer from a list of suggested answers some of which may be false. In many instances all are false except one. Note the following illustration of a best-answer test:

Topic: How the Colonists Lived

Directions. Check the word or phrase that makes the statement true in each of the following exercises:

1. The English Parliament restricted the trade of the colonies in:

   1) Woolen goods.
   2) Shoes.
   3) Iron.

2. The colonists were largely:

   1) Merchants and traders.
   2) Farmers or planters.
   3) Laborers in factories and shops.
   4) Members of the leisure class.

Thus the test would be continued to include a

dozen or more statements. The teacher can make it of any length that she may desire.

This test, like the true-false test, can be scored accurately if a definite plan is formulated before any scoring is done. A fixed number of points may be allowed for each answer correctly checked or the statements may be evaluated according to the teacher's judgment and more points allowed for the difficult statements and fewer for the easier ones.

In giving this test a written or typewritten copy should be placed in the hands of each pupil and a time limit imposed within which the work must be completed or as much of it as possible in the allotted time.

The *completion test* also may be used to check up the progress of a class. This test consists of a number of sentences or paragraphs with important words omitted. The pupil is required to fill the blank spaces with the appropriate words. The following paragraph from Bourne and Benton's *History of the United States*, chapter XII, may be used as a sample of this type of test:

Topic: Religion

The colonists were very religious. Virginia, Maryland, and the Carolinas adopted the..... Everyone was obliged to pay for its services. Maryland had originally been planned as a refuge for the.....,

but the..... in time outnumbered them twelve to one. In Massachusetts and Connecticut most people were....., ... were numerous in Rhode Island and North Carolina, and..... in New Jersey and Pennsylvania. Wherever the Scotch-Irish settled .....churches were found.

This test can be made of any length that the teacher desires. Usually, only one or two paragraphs (or an equivalent amount of material) are included.

Duplicate copies of the material should be placed in the hands of the pupils with a time limit within which the work must be completed or as much of it as the pupil is able to do in the given time. The test may be scored by allowing a certain number of points for each blank correctly filled. The total number of points should be the same in all the tests so that the results will be directly comparable and easily represented graphically.

Finally, the results of all the tests should be represented graphically and each pupil encouraged to keep a graph showing his progress in comparison with the progress of the class. The pupil's graph should exhibit the highest, lowest, and median scores of the class on a series of tests and his own individual scores. Figure VIII illustrates this method of keeping a pupil informed of his standing in the class.

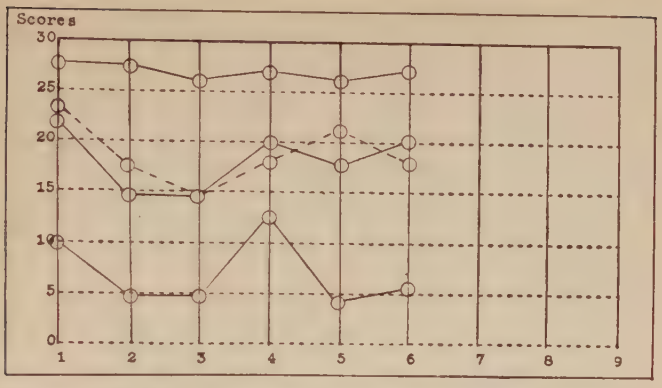

Figure VIII. Showing the scores of one class on a series of true-false tests. The solid lines represent the class scores, highest, median, and lowest scores. The broken line represents the scores of one pupil of about average ability.

To summarize: The teacher can check up frequently on the work of the pupils and keep them informed of their standing in the class by administering the standard tests as often as may be convenient and by giving improvised tests frequently. The latter may be short tests of the essay type, true-false tests, best-answer tests, or completion tests. There should be a time limit for each. These tests should be graded on a point scale, allowing the same number of points for a perfect score on each test, and the results be represented graphically. The pupils should be taught how to make individual graphs showing their standing in the class.

For a demonstration of this type of work, see experiment 4, chapter XIII.

Summary of section. This chapter is devoted to the problem of directing a class in assimilative thinking or reflective reading. What can the teacher do in supervising this type of study?

In the primary grades she can do the following things:

1. Train the pupils to read with specific aims—to find the central idea or theme of a selection.
2. Teach the pupil to locate the main divisions of reading material, give him some devices for indicating these divisions, and show him how to select and organize ideas.
3. Use the best methods of memorizing.
4. Teach the pupils to interpret what they read in terms of life situations.
5. Check up on the pupil's reading ability with the standard tests; diagnose his reading ability and apply remedial measures.

In the upper grades and high school the following points should be emphasized:

1. Reading with specific aims and learning how to discover these aims.
2. Formulating these aims as specific problems and keeping them constantly in view—also how to judge the worth of the material in the light of the aims or problems.
3. Organizing material around specific aims or prob-

lems and making summaries and outlines of what is read.

4. Evaluating what is read by the following standards:

1) The degree of relevancy to the aim
2) The reliability of the data upon which the conclusions are based
3) The testing of the facts and conclusions in the light of observation and experimentation
4) The necessity of appealing to authority
5) The relation of the matter to life

5. Using a rating scale to determine the reliability of reading material.

6. Employing the following rules for the economic use of the memory:

1) Recite to oneself as an aid to memorizing.
2) Combine the whole and part methods of memorizing, making the whole method the basis of the work and using the part method at difficult points.
3) Overlearn material.
4) Review frequently, distributing the repetitions over a considerable space of time.

7. Teach the pupils to apply what they read to life situations.

8. Check up accurately on the work of the pupils and keep them informed of their progress. To this end use the standard scales—also tests devised by the teacher. The latter should be given frequently. Use the newer type of tests, as the true-false test, the completion test, and the best-answer test. Represent the results graphically.

III. Assimilative Thinking and School Subjects

What school subjects are to a considerable extent reading subjects? Practically all the subjects require some reading of the reflective type but a few of the school subjects are commonly studied largely by reading; i. e., through assimilative thinking. This is true especially of history, geography, civics, and hygiene. In the following pages an attempt will be made to show how the teacher can provide for the factors of assimilative thinking, as outlined in chapter VII, in supervising the study of these subjects.

1. History

Perhaps the best way to make clear how to direct assimilative thinking in history is to describe some actual teaching. The lessons described in the following paragraphs were taught by Miss Thora Robinson, sixth-grade teacher in the White School, Fairmont, W. Va. In this series of three lessons the teacher made an attempt to provide for the essential factors of assimilative thinking.

Topic: King Alfred the Great

Material. The material for these lessons is found in Bourne and Benton's *Introductory American History*, pp. 100-102, and in selected references. In addition to an introductory paragraph the text contains four short

sections on King Alfred and his work for the betterment of England. The selected references provided material for reports on certain phases of his life.

Aim. The aim as stated by the teacher in her lesson plan was, "To lead the pupils to learn what King Alfred did for England and to admire his character."

Assignment. The pupils were led in the assignment to set up a specific aim for their study; namely, What important things did King Alfred do for England? List these in the order of their importance. Four individual assignments were made for special reports, comprising the following topics: (1) Alfred the boy, (2) how Alfred defeated the Danes, (3) Alfred the King, and (4) Alfred's last years.

Study. Immediately following the assignment about fifteen minutes were devoted to silent study under the direction of the teacher. About half of the class was able to complete the textbook assignment in this study period. Those who did not finish their work were encouraged to complete it at home. The special reports were to be prepared at home or in some other study period.

Class periods. Two class periods were devoted to a discussion of the assignment. The first period was given to a discussion of the material in the text. The main points were selected and organized and their relative values considered. Finally, the main points were arranged in a brief outline or summary:

1. King Alfred educated the people in these ways:
    1) Sent for priests and monks to teach the people.
    2) Translated Latin books into English.

3) Had the clergy keep records of events—
The Anglo-Saxon Chronicle.

2. He created the English navy.
3. He reorganized the army, making it more efficient.

In the second class period the points considered in the first period were reviewed briefly. Then the pupils who had been given special assignments made their reports to the class. Each pupil, in turn, stood before the class and made his report, using only a brief outline of the points he desired to present. After all the reports had been given and the points evaluated the class made a new outline, including the additional points presented in the reports. The revised outline comprised the following points:

1. Alfred educated the people.
2. He created a navy.
3. He reorganized the army.
4. He reformed the laws.
5. He encouraged trade and travel.
6. He encouraged craftsmen, jewelers, and goldsmiths.
7. He built up England in many other ways.

At the conclusion of the last lesson the teacher had the pupils summarize the ideas that they had acquired by asking, "Why do you think King Alfred is called Alfred the Great? Is this title justified in the light of the facts?"

These lessons illustrate very well the essential factors of assimilative thinking; namely:

1. The setting up of specific aims
2. The selection and organization of the main points
3. Judging the worth of material
4. Memorizing the main points
5. Application to life situations

Note how each of these factors is provided for in the foregoing lessons. For another illustration of this type of work, see chapter XIII, experiment 4, Supervising the Study of History in the High School.

2. Civics

Similarly, a chapter in civics may be studied; for example, chapter IX in Dunn's *Community and the Citizen*, "How the Community Aids the Citizen to Satisfy His Desire for Health." The first step is the formulation of an aim for the study. This may be approached through a discussion of the value of health and the primitive methods of dealing with disease. In this preliminary discussion the pupils should be led to set up one or more specific aims, such as:

1. How does the community aid us in maintaining our health?
2. What do we as individuals owe the community for this protection?

These aims should be broad and comprehensive enough to require a thorough study of the whole

chapter for their satisfaction or realization, and perhaps of some supplementary material.

Then, with the aims in mind, the pupil should proceed to select and organize the main points in the chapter. The results of this study should be crystallized in an outline or summary which may take the following form:

What the Community Does for the Citizen

1. Provides a water supply and a drainage system.
2. Cleans the streets.
3. Provides parks and playgrounds.
4. Provides hospitals in some cases; also quarantines, thus preventing the spread of disease.
5. Supervises health (coöperating with the State), preventing the pollution of streams, the adulteration of food, and the spread of disease through travel and immigration.

What the Citizen Owes to the Community

1. The observance of health regulations.
2. A lively interest in what the community is doing to protect health and a willingness to coöperate with the state in protecting the health of the people.

Each point in the outline may be considered from the standpoint of its bearing on the health of the community and its importance thereby evaluated. Again, an attempt may be made to determine the relative value of these points and to list them in the order of their importance.

Application is provided for in the consideration of the responsibilities of the citizen, of what he owes to the community. This point should be strongly emphasized in the class discussions. In this connection local health problems should be considered and the pupils' duties and responsibilities clearly revealed.

Supplementary reading and reports to the class may well be required, for the material on this subject is abundant and very informing. The pupils may be asked to read other books and magazines and to report their findings to the class for evaluation. If additional points are found they should be incorporated in the outline or summary made from a study of the test.

3. Hygiene

How should pupils react to the material found in chapter XIV, "Our Friend The Sun," *Health and Success*, by Andress and Mace? In the assignment the pupils should be led to set up a specific aim to guide their reading as, How is the sun our friend? Then they should read to find an answer to this question. This will give point and effect to their reading.

The pupils should select and organize the main points in the form of an outline, showing what the sun does as our friend.

Our Friend the Sun

1. In the olden time children had scrofula and people thought the king's touch would cure it but King Sun is the only king that can cure this disease.
2. Sunshine makes plants healthy. Only molds and the like will grow without sunshine.
3. Sunshine is the friend of animals, too. Chickens will not develop into fine, healthy fowls without sunlight. The same is true of other animals.
4. Sunshine makes children healthy. Sun baths are excellent for sick children.
5. But an overdose of sunshine may be harmful:
   1) It may hurt the eyes.
   2) It may cause a severe headache.
   3) It may burn the skin severely.
   4) It may cause sunstroke, a severe illness.
6. Children should play in the sunshine.
7. They should let the sun into their houses.

In the class discussions each of these points should be evaluated with respect to their bearing upon the health of the pupils. Then review questions may be asked by the teacher or a short test given, covering the main points in the chapter.

How to apply these hygienic ideas in daily life should receive careful consideration, for the formation of health habits is the final objective in teaching hygiene. How can the pupil make the sun his friend? What must the pupil do? What habits should be formed? Pupils should learn to sun their

rooms daily, to avoid excess of sunlight, and to play in the sun every day that the sun shines.

In this manner the essential factors of assimilative thinking are provided for and the pupil's mastery of the material is assured. Other chapters of this text and of supplementary texts may be treated in a similar way and additional material read; the pupils are learning how to read as well as learning hygiene.

4. Geography

How should pupils study the material found in the section on Brazil in Tarr and McMurry's *New Geographies*, Second Book, pp. 243-245? In approaching the study of this material the first step is to lead the pupils to set up one or more specific aims to guide their study. These aims should be comprehensive enough to require a careful reading of the text and perhaps of supplementary material. They may take the form of definite questions to be answered by a careful study of the material. Questions like those that follow may serve as a basis for the selection, organization, and evaluation of the important points:

1. What do we get from Brazil?
2. How does Brazil compare with the United States in size, surface features, and climate?
3. What are the important industries?

4. What are the principal cities? Why are these cities important?

The pupils should hold these aims in mind as they read the material and they should select and organize the main points, grouping them around these questions. They should summarize these points in brief and compact form similar to the following synopsis:

1. The chief imports from Brazil are coffee, sugar, and rubber; vanilla, cocoa, and tapioca are also imported.

2. Brazil is the largest country of South America. It is larger than the United States exclusive of Alaska. The climate is warmer and damper than that of the United States. The eastern part is a highland region but the northern part is a vast, level plain. Numerous streams drain the upland region, the largest of which is the Amazon, the largest river in the world.

3. The dense tropical forests produce fruits, dyewoods, vanilla, mandioca, *yerba maté*, and rubber. The chief agricultural products are coffee, cotton, sugar, corn, and tobacco. The highlands contain valuable minerals, especially gold and diamonds. Coal and iron are found also. Manufacturing is beginning to be important, particularly in southern Brazil. Cotton cloth, woolen goods, and flour are manufactured extensively.

4. The principal cities are Rio de Janeiro, the capital, Para, Bahia, Santos, São Paulo, and Pernambuco. These cities are important seaports. Coffee is shipped from Rio de Janeiro and Santos. Pernambuco is the chief port for sugar and cotton. Para is the center of the rubber industry.

The material in the text should be supplemented by references dealing with the more important topics, such as the rubber industry and coffee production. The pupils should read these references and report their important findings in class. The points presented should be evaluated and incorporated in the outline in their proper setting. The first study period may well be devoted to the making of an outline and the first class period to a discussion and evaluation of the points in the outline. Additional class periods may be assigned to reports on the reference readings. The points presented should be evaluated and related to the main outline. Finally it should be revised and made to include all the important points arranged in systematic order.

Thus assimilative thinking may be provided for in history, civics, hygiene, and geography or in any other subject requiring a large amount of reading. But the exercises should be varied to avoid monotony. For example, the pupils may be directed to do any one of these:

1. Make a sentence outline of the material.
2. Make a summary of the important points.
3. Find the answers to a list of questions.
4. List the important questions answered in the material to be read.
5. Read the material and state the main problem under discussion.

6. Mark their books to indicate the main points in the selection.

Sometimes two or three of these exercises may be used in combination. In every case the pupil should be required to use his judgment in selecting and arranging the items in the material being studied. Of course, making an outline or summary requires the pupil to judge the relative importance of the various items in the selection. The discussion of the reports on the reference readings offers another opportunity for the exercise of judgment on the part of the pupils. The points presented should be evaluated from the standpoint of their bearing upon the specific aim under consideration and, to some extent, from the standpoint of their reliability. For example, the pupils should observe whether the writer is merely expressing his own opinions or citing facts to prove his points.

The application of the main points to life situations should always be emphasized. How these ideas concern us is always an important consideration. How the community aids the pupil in maintaining his health is no more important than how the pupil can coöperate with the community in health work. How the sun is our friend is no more important than how we can make the sun a valuable friend. In other words, knowledge as such is not the objective in reading but knowledge at work in guiding our reactions to life situations.

CLASS EXERCISES

1. Make a list of the values to be obtained from reading with specific aims.
2. How would you teach pupils to read with specific aims?
3. Examine a number of recent books on the teaching of reading and note to what extent the authors emphasize larger units in reading.
4. Make a list of the devices that may be used to indicate the main divisions of reading material, particularly in the primary grades.
5. Read the preface to several books, noting in each case, whether the author states his aim and his general viewpoint.
6. How would you teach pupils to select and organize the main points in what they read?
7. Read several short selections and evaluate the material. Make a list of the standards that may be used in judging the worth of material.
8. Make a rating scale, similar to the one suggested in this chapter, to determine the reliability of reading material. Rate several short selections on this scale. Is this a valid method of evaluating material?
9. How would you get pupils to pass judgment on what they read?
10. What directions would you give pupils to guide them in the use of the memory function? Make a list of these.

REFERENCES FOR CLASS USE

1. Adams, John. *Making the Most of One's Mind.* Chaps. III-VIII. New York: Geo. H. Doran and Company. 1915.

(A general discussion of reading as a form of study.)

2. Book, W. F. *Learning How to Study and Work Effectively.* Chap. XVII. Boston: Ginn and Company. 1926.

(Gives specific direction to the student as to how to prepare an assignment in a text.)

3. Boraas, J. *Teaching to Think.* Chaps. III, IV, and XI. New York: The Macmillan Company. 1922.

(Chapters III and IV discuss the development of individual group judgment. Chapter XI discusses the development of skill in critical reading, suggesting several exercises for the student.)

4. Dearborn, G. V. N. *How to Learn Easily.* Chaps. II and VI. Boston: Little, Brown and Company. 1916.

(Chapter II is a good discussion of note-taking, and chapter VI gives valuable suggestions on examination-preparedness.)

5. Freeman, F. N. *How Children Learn.* Chap. X. New York: Houghton Mifflin Company. 1917.

(Discusses the use of the memory function, giving specific rules for memorizing materials.)

6. Hall-Quest, A. L. *Supervised Study.* Chaps. VII, VIII, X, and XI. New York: The Macmillan Company. 1916.

(Chapters VII and VIII discuss methods of studying; chapters X and XI apply these methods to the study of history and civics.)

7. Hall-Quest, A. L. *Supervised Study in the Elementary School.* Chaps. VIII, XV, and

XVII. New York: The Macmillan Company. 1924.

(A discussion of supervised study in geography, history, and civics. Each chapter contains a bibliography.)

8. KERFOOT, J. B. *How to Read.* New York: Houghton Mifflin Company. 1916.

(A stimulating discussion of the reading process. Written in attractive style.)

9. KITSON, H. D. *How to Use Your Mind.* Chaps. II, V, and XI. Philadelphia: J. B. Lippincott Company. 1916.

(Offers valuable suggestions on note-taking, memorizing, and preparing for examinations.)

10. LYMAN, R. L. *The Mind at Work.* Chaps. II and VI. Chicago: Scott, Foresman and Company. 1924.

(Chapter II is an illuminating discussion of useful study habits. Chapter VI deals with the evaluation of what one reads, offers definite standards of evaluation, and warns against some common pitfalls in thinking.)

11. MCCALL, W. A. *How to Measure in Education.* Chap. IV. New York: The Macmillan Company. 1922.

(Explains how to use practice tests, the true-false test, and the standard tests. A particularly good discussion of the preparation and use of the true-false test.)

12. PARKER, S. C. *Types of Elementary Teaching and Learning.* Chap. XI. Boston: Ginn and Company. 1923.

(Analyzes reflective reading, giving sample lessons.)

13. Patterson, D. G. *Preparation and Use of New-Type Examinations.* Yonkers-on-Hudson, N. Y.: World Book Company. 1925.
(A good manual for the teacher. Explains how to prepare and use the new-type examinations for frequent testing.)

14. Ruch, G. M. *The Improvement of the Written Examination.* Chicago: Scott, Foresman and Company. 1924.
(A comprehensive treatment of the written examination. Presents the evidence concerning the reliability of the different types of tests and illustrates clearly how these tests may be prepared.)

15. Russell, Charles. *Classroom Tests.* Boston: Ginn and Company. 1926.
(Shows how to make and use the new type of tests. Indicates the advantages and disadvantages of the various types of tests.)

16. Simpson, Mabel. *Supervised Study in History.* New York: The Macmillan Company. 1918.
(Shows how to apply the principles of supervised study to history, giving many illustrative lessons.)

17. Smith, W. A. *The Reading Process.* Chaps. V, VI, and VIII. New York: The Macmillan Company. 1922.
(Discusses methods of teaching reading. Chapter VIII summarizes several investigations of rate and comprehension in reading.)

18. Stormzand, M. J. *American History Teaching and Testing.* New York: The Macmillan Company. 1925.

(Part II discusses the supervised-study plan for teaching history. Part III presents a complete set of tests for Beard and Bagley's *History of the American People.*)

19. WHEAT, H. G. *The Teaching of Reading.* Boston: Ginn and Company. 1923.

(A good discussion of the general problem of teaching reading as a process of thought getting.)

20. WILSON, H. B. *Training Pupils to Study.* Baltimore, Md.: Warwick and York, Inc. 1917.

(Gives definite suggestions for the application of the factors of assimilative thinking.)

CHAPTER IX

FACTORS OF PROBLEM SOLVING

Questions to Be Kept in Mind When Reading

1. What are the main steps or processes in solving a problem in arithmetic?
2. Are these processes the same in problem solving as in other subjects?

The aim of this chapter is to make clear by exposition and illustration the factors or processes of the problem-solving type of school activity. How does a human being react to a problematic situation? How should pupils react to problems? Since arithmetic is the problem-solving subject, par excellence, this subject may properly engage our attention at the outset. Moreover, the processes of thinking are fundamentally the same in all problems, whether they be problems in arithmetic or some other subject. Furthermore, common observation, as well as scientific tests, reveals the fact that problem solving in arithmetic offers unusual difficulties to pupils. Comparatively few pupils ever acquire much ability in solving original problems. Notwithstanding this fact writers on the teaching of arithmetic devote very little space to a discussion of problem solving. An examination

of texts on the teaching of arithmetic will show that, on the average, less than 10% of the space is devoted to problem solving. Likewise, professional magazines have very little to say about problem solving. Obviously, the difficulty and importance of this topic justifies a more adequate treatment. In the following pages an attempt is made to outline the steps involved in solving a problem in arithmetic.

1. Problem Solving in Arithmetic

Monroe, in *Measuring the Results of Teaching*, pp. 160-162,[1] analyzes problem solving in arithmetic into the following steps:

1. Reading the problem with understanding
2. Recalling the principles applicable to the problem
3. Formulating a plan of procedure
4. Verifying the hypothesis or plan of procedure
5. Performing the operations required by the plan of procedure

Klapper[2] outlines the steps in solving a problem in arithmetic as follows:

1. A clear recognition of what is called for in the problem
2. Planning the solution
3. Carrying out the plan
4. Checking the answer

[1] Used by special arrangement with Houghton Mifflin Company.

[2] Klapper, Paul. *The Teaching of Arithmetic*. p. 280. By permission of D. Appleton and Company, New York.

Similar views are expressed by other writers. In fact, the statements are so much alike that further quotations would be mere repetition. Of course, the statements made by different authors vary considerably in minor details, but they are all in essential agreement with respect to the main processes. Perhaps all would agree that the following steps are essential to efficient work in problem solving:

1. Reading the problem with understanding
2. Examining the data bearing on the problem: the form of the statement, the technical terms, and the principles involved
3. Planning a solution of the problem
4. Performing the necessary operations
5. Checking, or verifying, the results

These steps may be clarified further by studying them in relation to some simple problems as, for example:

Find the area of a rectangular plot of ground 12 rods by 30 rods.

1. To read this problem intelligently the pupil must know the meaning of technical terms, such as "area," "rectangle," "rods." He must be able to picture to himself the form of the plot and to comprehend the situation so clearly that he could draw a figure representing it and indicate its dimensions.

2. He must recall or learn the rule for finding the area of a rectangle when the length and breadth are

given. If he does not understand the principle that applies he cannot proceed further with the solution of the problem.

3. On the basis of the technical terms and the principles involved, the pupil must plan a solution. In this problem the solution would take the following form: Multiply the length by the breadth (12 by 30) and reduce to acres by dividing by 160, the number of square rods in one acre.

4. He must perform the operations required by the plan of the solution.

5. He must verify the results obtained.

Take as another illustration this problem:

The wages of a gang of workmen are to be raised 25% above the present scale. After the raise how much will a man receive who is now earning $4.60?

Here again there are five steps:

1. Reading the problem requires a knowledge of the technical terms: "wages," "per cent," and "scale"; also an understanding of the setting and conditions of the problem. The pupil must be able to picture to himself the real life situation.

2. He must interpret the technical terms, consider the form of the statement, and recall the principle that applies.

3. On the basis of these data he must plan the solution of the problem.

4. He must perform the operations required by the plan thus formulated.

5. He must verify the results obtained.

Thus it will be seen that all problems involve

essentially the same steps. A clear recognition of this fact on the part of the teacher will simplify the supervision of problem solving in arithmetic.

II. Problem Solving in Other Subjects

But to what extent is arithmetic a typical problem-solving subject? Are the same steps involved in solving problems in other subjects? Dewey,[1] in his famous chapter, "The Analysis of a Complete Act of Thought," describes three typical cases of problem solving and generalizes as follows:

> Upon examination, each instance reveals, more or less clearly, five logically distinct steps: (I) a felt difficulty; (II) its location and definition; (III) suggestion of possible solution; (IV) development by reasoning of the bearings of the suggestion; (V) further observation and experiment leading to its acceptance or rejection; that is, the conclusion of belief or disbelief.

It will be observed that the five logical steps of problem solving as outlined by Dewey are essentially the same as the steps in solving a problem in arithmetic. In fact, problem solving in arithmetic is merely a special case of this type of thinking; that is, the application of thought to a particular subject.

Similarly, Wilson, Kyte, and Lull[2] summarize their discussion of the problem method of learning:

[1] Reprinted from Dewey's *How We Think*. By special permission of D. C. Heath and Company. All rights reserved.

[2] From *Modern Methods in Teaching* by Wilson, Kyte, and Lull. p. 97. Published by Silver, Burdett and Company.

The problem, then, is solved by the pupil when he (1) has a clear conception of it; (2) recalls old experiences which may help in its solution; (3) acquires, out of new experiences, the additional information essential to determining the best reaction to it; (4) critically evaluates and manipulates these data to make them serve his needs and, supplementing them, corrects his tentative conclusion; (5) arrives at a conclusion; and (6) checks it against the problem to determine the correctness of the response to be made.

Boraas[1] lays down the following rules for developing skill in problem solving:

1. Understand clearly what is to be accomplished.
2. Analyze the problem, breaking it up into smaller problems.
3. Plan a method of attack.
4. Take stock of the available means of dealing with the problem.
5. Make tentative guesses as to possible answers.
6. Look for further information.
7. When the answer has been found check it for possible errors.

It will be observed that the foregoing writers are in essential agreement in stating the processes involved in solving a problem, which may be summarized as follows:

1. Locating and defining the problem

[1] From Boraas, J. *Teaching to Think*. p. 171. By permission of The Macmillan Company, publishers, New York.

2. Suggesting solutions of the problem or forming hypotheses
3. Evaluating each suggestion in the light of the data available
4. Drawing conclusions on the basis of evidence, or proof

But are these same processes involved in the project? What steps are involved in the working out of a project?

According to Branom,[1] one of the writers on the project method, the project problem has a fourfold aspect:

1. The preparatory step in which the pupil is made to feel a difficulty
2. Raising the problem and giving it a concise statement
3. Collecting and interpreting the material bearing on the problem
4. Summarizing or stating the conclusions or solution of the problem

Hatfield,[2] in his "The Project Method in Composition," outlines the method of procedure in working out a project in composition as follows:

1. Launch the project: (a) directing the attention of the class to a situation which calls for action; (b) setting

[1] Branom, M. E. *The Project Method in Education.* pp. 167-169. Richard G. Badger, publisher, The Gorham Press, Boston. 1919.

[2] Hatfield, W. W. "The Project Method in Composition." Reprinted from the *English Journal.* Vols. XI and XII.

imitation to work by telling what some one else has done; (c) so arousing the pupils' memories and imaginations that they will want to talk; (d) displaying dramatic pictures; and (e) asking questions.

2. Planning the attack upon the project. The general plans should be made by the group, then each pupil should plan his own composition.

3. Executing the plans; that is, writing and reading the compositions.

4. Judging the results in the light of the aim or purpose of the project.

Obviously, thinking out a project in composition involves essentially the same thought processes as solving a problem in arithmetic or in any other subject.

Moreover, Stevenson,[1] one of the leading contributors to the literature of the project method, emphasizes the point that the project as defined by him makes provision for the steps of logical thinking as outlined by Dewey. He says:

> The steps in the logical method of arriving at a solution of a problem are: (1) defining the problem, (2) collection of data, (3) hypothesis, (4) verification.
>
> The project when carried to completion uses the identical steps of logical thinking. If the foregoing items were given as constituting the method the project employs in arriving at solutions, the statement would be wholly correct. The project furnishes the opportunity

[1] From Stevenson, J. A. *The Project Method in Teaching.* p. 126. By permission of The Macmillan Company, publishers, New York. 1921.

for placing pupils in situations in which it is absolutely necessary that they think in order to solve the difficulty.

Likewise, Moore,[1] writes:

The story of every great invention is the story of a project and in it we find the following elements:

A felt need, real, vital, growing out of the unanswered past of one's environment.

A growing interest and enthusiasm calling for one's best energies and resulting in activity.

A broad, comprehensive search for related material.

An organization of the results of personal activity for solving the given project. This summary does not differ greatly from Dewey's analysis of the completed act of thought.

Thus it will be seen that the writers in this field are in essential agreement with respect to the fundamental processes involved in problem solving though, naturally, the processes differ more or less with the nature of the problem and the equipment of the learner. Furthermore, the steps, or processes, are essentially the same whether the problematical situation be designated a problem or a project. Summarizing the ideas set forth in the preceding paragraphs, then, we may say that problem solving—whether of problem or project—involves the following steps, or processes:

[1] Moore, J. C. *School Science and Mathematics*, Chicago. Vol. XVI. p. 688.

1. Locating and defining the problem
2. Suggesting solutions
3. Evaluating these suggestions in the light of the data bearing on the problem
4. Drawing conclusions or summarizing the results of the study of the problem

To illustrate these processes further, let us examine a series of problem-solving lessons in geography[1] which were actually worked out in the schoolroom in the autumn of 1923 when the newspapers and magazines were full of the accounts of the earthquake in Japan and its horrors.

Topic: Japan

1. Locating and defining the problem. First, the teacher read from a local newspaper a short article relative to the need of the Red Cross for funds for Japanese relief and asked what the pupils thought of this situation. A general discussion followed in which the pupils expressed their ideas of the earthquake with its destruction of life and property and of the desirability of our helping the Japanese. This discussion aroused considerable interest and brought out the fact that the pupils needed more information in order that they might be able to discuss the situation intelligently. At this point the teacher inquired what the pupils would like to know about the situation in Japan. They responded by raising a number of problems, such as:

[1]Taught by Miss Louise Leonard, in the fifth grade of the Butcher School, Fairmont, W. Va.

1) What caused the earthquake?
2) What was the effect of the earthquake?
3) What kind of buildings do the Japanese have?
4) What do we get from Japan?
5) What kinds of foods do we send Japan?
6) What kind of climate has Japan?
7) Should we help the Japanese?

These problems were then assigned to groups of individuals, opportunity being given for each pupil to select the problem that interested him most. Each of these groups organized for its work by electing a chairman and a secretary. Then the chairman assigned subtopics to the members of his group. The secretary made a record of these assignments and presented them to the teacher for her approval before giving the pupils their assignments.

2. Suggesting solutions to the problems. The groups spent three days in silent study in the preparation of their reports to the class. The teacher went from group to group to give individual help, largely in the form of questions and suggestions. When the members of any group had completed their individual assignments the group met to hear and criticize the report of each member. Following this preliminary discussion each group made its report to the class, the chairman acting as leader.

3. Evaluating the suggestions offered by the groups. When the group reports were being made the whole class was given an opportunity to question or challenge any statement or to ask for proof of any point. The teacher stimulated and guided this critical thinking by asking questions like these:

1) What do you think of John's report? Do the facts support his statements?
2) Does that point help us to solve our problem?
3) Did Mary talk to the point?
4) What bearing does this point have on our problem?
5) What is your authority for this statement?
6) Where can you find material on this point?
7) What proof have you for this statement?

In this manner each suggestion was evaluated in the light of the available data, secured largely from the following sources:

McMurry and Parkins' *Geography* and other texts
Newspapers, *The National Geographic Magazine* and other magazines
Book of Knowledge
Carpenter's *Geographical Reader*
Huntington's *Geographical Reader*

4. Conclusions. The report of each group was summarized on the blackboard as each point was evaluated and accepted. These summaries constituted the conclusions drawn from the study and comprised the following important points as well as several minor ones which are not included:

1) The earthquake was caused by a slipping of the earth's crust.
2) The tidal wave caused by the disturbance of the earth's crust was very destructive of life and property.

3) The buildings in Japan are planned to withstand the earthquakes and to cause as little destruction as possible in falling.
4) We get most of our silk from Japan. The earthquake will cause the price of silk to rise. Much of our tea comes from Japan.
5) We send Japan flour and sugar.
6) Japan has a varied climate but Nippon, the main island, has a warm, temperate climate with an abundance of rainfall.
7) We should aid the Japanese for two reasons, to relieve their suffering and to promote a friendly feeling between Japan and the United States.

Obviously, the foregoing lessons involve all the processes of reflective thinking. The attention of the reader is directed to the devices used by the teacher to get the pupils to locate and define their problems and to evaluate the solutions offered. The problems are chosen by the pupils, not thrust upon them by the teacher. The suggestions offered by the various pupils are evaluated from the viewpoint of their bearing on the problem under consideration and in the light of the facts from every available source. Pupils are called upon to prove their statements or to justify them in the light of the available facts. Finally, the results of the study are summarized, thus providing for the proper organization of the material.

III. Summary

The conclusions concerning problem solving may be briefly summarized as follows:

1. Problem solving in arithmetic embraces the following processes:

1) Reading the problem intelligently
2) Examining data bearing on the problem: technical terms, the form of the statement, and the principle
3) Planning a solution of the problem
4) Performing the necessary operations
5) Verifying the results obtained

2. Problem solving in arithmetic is typical of problem solving in other subjects, for the fundamental processes are essentially the same in dealing with problematical situations in whatever connections these may arise.

3. Dewey, Thomas, Branom, Stevenson, Hatfield, and Boraas—as well as other writers not quoted here—are in essential agreement in stating the fundamental processes involved in problem solving. These processes may be stated as follows:

1) Locating and defining the problem
2) Suggesting solutions to the problem
3) Evaluating these suggestions in the light of available data, leading to their acceptance or rejection
4) Drawing conclusions or summarizing the results of the study

CLASS EXERCISES

1. Criticize Monroe's analysis of the processes involved in solving a problem in arithmetic.
2. Illustrate these steps by selecting a few problems and indicating each step in the solution.
3. Recall some problem that you have solved. Analyze the thought processes involved.
4. Make a critical review of chapter VI of Dewey's *How We Think*.
5. Compare the steps in reflective thinking as outlined by Dewey with the steps in solving a problem in arithmetic as outlined by Monroe. Are the processes fundamentally the same or fundamentally different? Prove that your answer is correct.
6. What is the difference, if any, between a problem and a project from the standpoint of the thinking processes involved? (How should one proceed in solving this problem? Outline or plan a method of solution.)
7. Observe the teaching of a problem-solving lesson or a series of lessons and outline the steps involved.
8. Summarize the results of your study of this chapter.

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CHAPTER X

SUPERVISING PROBLEM SOLVING

Questions to Be Kept in Mind When Reading

1. What can the teacher do to help her pupils to acquire the ability to solve problems in arithmetic?
2. How can pupils be trained to think in geography, history, civics, general science, and other school subjects?
3. How can the pupil be kept informed of his progress in this type of work?

The present chapter aims to set forth as clearly as possible the principles and processes involved in the effective supervision of the problem-solving type of learning. Arithmetic will be treated as a typical problem subject and other subjects will be considered briefly by comparison.

Let us see what the teacher can do to help the pupils acquire reasonable facility in solving problems in arithmetic.

1. Problem Solving in Arithmetic

1. Diagnose ability of class. First, administer one or more of the standard reasoning tests in arithmetic, score the papers, and analyze the results. Inform each pupil of his standing on each test, for improvement will be facilitated by the feel-

ing of need for improvement. Second, assign a list of problems to be solved in a study period and observe the pupils at their work, noting how they react to problems. Ask the pupils to write a paper describing, step by step, how they proceed in solving a problem. Then analyze as best you can, from your observation and from these papers, each pupil's method of procedure in attacking a problem. Thus the ability of a class may be diagnosed preliminary to the application of remedial measures.

2. **Apply remedial measures.** In most classes the pupils will need specific help on each step in the reasoning process. Consequently, each of the following steps should be emphasized according to the needs of the class that is being supervised.

1) Reading the problem intelligently. The reading of a problem is a more complex and difficult process than most teachers realize. The writer once knew an eccentric old gentleman who claimed that he could solve any problem that he could read. People laughed at the saying and thought the old man queer. His statement may have been a bit too strong but it was not far from the truth. At any rate reading a problem is an intricate process, requiring the association of meanings with symbols and the combining of the several elements of meaning in such a way as to grasp the full significance of

the problem. In stating problems many technical terms are employed which must be interpreted. The total technical vocabulary required of elementary pupils is quite extensive. Checking up on the pupil's technical vocabulary, therefore, may well be the first step in teaching him to read problems. To this end the teacher should be familiar with the work that has been done in this field by Sara E. Chase,[1] who has devised a test to measure the pupil's knowledge of technical terms. The terms used in this test were selected on the basis of their being common to three or four of the newer textbooks for the grades in which the tests were given. Table XXI is a reproduction of Chase's vocabulary test in arithmetic.

In a similar test the pupils were asked to draw some of the common geometrical figures, with the results as summarized in Table XXII. (See p. 390.)

In many instances the percentage of pupils ignorant of the terms used in these tests is surprisingly large. Obviously, pupils cannot read problems unless they know the meaning of the terms in the problems. The initial step, therefore, in supervising problem solving in arithmetic is to test the pupils' knowledge of the words employed in stating the problems, particularly the technical terms. The teacher can administer the Chase tests to her class

[1] Chase, Sara E. "Waste in Arithmetic." *Teachers College Record*. September, 1919.

TABLE XXI. SHOWING THE PERCENTAGE OF FAILURES ON A VOCABULARY TEST IN ARITHMETIC (AFTER CHASE)

	GRADE			GRADE	
	IV	V		IV	V
basin	26	20	merchant	45	24
salary	40	20	cashier	52	20
retail	30	16	building lot	65	32
mason	78	36	attend	4	4
basket	13	8	teamster	88	40
lot	9	12	jars	40	16
bucket	30	16	debts	91	32
rent	56	28	gardener	17	8
machinist	35	28	expenses	65	20
coins	26	16	nickel	13	16
broker	56	45	owe	91	60
excavate	4	4	schedule	17	4
area	91	36	profit	78	45
carpenter	26	8	pasture	52	32
field	9	8	earn	60	36
bin	43	20	collect	17	8
real estate	100	68	tank	65	36
poultry	40	36	acre	56	32
fares	65	60	income	96	41
dealer	35	24	insurance	91	42
tailor	13	4	miller	26	12
barrel	30	32	cistern	100	88
wages	70	28	customer	35	44
commission	100	68			

TABLE XXII. SHOWING THE PERCENTAGE OF PUPILS FAILING TO DRAW CORRECTLY THE FIGURES NAMED (AFTER CHASE)

FIGURES	GRADES III	IV	V
Square	10	4	8
Rectangle	100	39	80
Triangle	50	35	20
Oblong	15	40	4
Rectangle plot		87	68

or, better still, devise similar tests based upon the terms found in the text for her grade and upon those commonly used in stating practical problems. Thus she can discover what words need attention. If any word, such as "profit" or "rectangle," is unknown to a large percentage of the class, the meaning of this word should be taught to the group as a whole; if only a few pupils are ignorant of the term, individual instruction would be more economical.

In teaching the meaning of technical terms, proceed as follows:

1. Illustrate the meaning with several typical examples.

2. Require the pupils to compare these examples and to attempt to define the term.

3. Provide exercises to give practice in using the term.

4. Finally, require the pupils to formulate a clear and precise definition.

Another essential factor in reading is a clear visualization of the conditions of the problem. How can this visualization be stimulated and directed? One of the best aids in grasping the conditions of a problem is graphic representation. This device is particularly helpful in problems involving geometrical figures or fractional parts. In finding the area of a rectangular plot the pupil will be forced to visualize the situation if he is required to draw a rectangle and indicate its dimension. Again, grasping the conditions of a problem may be stimulated by selecting problems from real life situations. This will enable a pupil to use his daily experience in interpreting the problems of the textbook. For the average American boy, problems relating to foreign exchange are much more difficult to read than problems relating to the batting average of baseball teams. Furthermore, hypothetical problems unrelated to life lack motivation, whereas problems closely related to the life of the pupil stimulate to greater self-activity. The increased interest and attention make for ready comprehension.

Finally, the teacher should provide abundant practice in reading problems. Whole periods may well be given to practice in reading problems understandingly. Experiments have shown that any function will improve with practice under favorable conditions. Thus Starch[1] asserts:

> One of the striking discoveries of experimental investigation is the very rapid progress in specific functions when the practicing is done on the particular connections to be established.

Similarly, Thorndike[2] states:

> Hardly any functions have ever been practiced in the course of scientific study of mental functions which did not improve and, provided they were of fairly narrow scope and with success and failure easily distinguishable, at a fairly rapid rate.

The teacher can improve the ability of her class to read problems in arithmetic, if she will:

1. Test the pupil's knowledge of technical terms, using the tests worked out by Chase and other tests compiled from the technical terms used in the grade.
2. Give specific instruction in technical terms according to the needs of the class as determined by tests and by observations.
3. Employ the best available devices to stimulate

[1] From Starch, Daniel. *Educational Psychology.* p. 159. By permission of The Macmillan Company, publishers, New York. 1919.

[2] Thorndike, E. L. *Educational Psychology. Briefer Course.* p. 200. Teachers College, Columbia University, New York. 1916.

and direct the pupils in visualizing the conditions of the problem.

4. Use as far as possible problems taken from real life situations and closely related to the experiences of the pupils.

5. Provide abundant practice in reading problems under favorable conditions.

2) Examining data bearing on the problem. The mere fact that a pupil is able to grasp the meaning of the technical terms and to understand principles is no guarantee that he will use this knowledge when he is confronted with a problem. The truth is that a strong tendency exists to neglect the meaning of the technical terms and the recall of the principles, as well as the form of the statement, and proceed immediately to guess at the operations to be performed. Frequently, pupils will ask, "What shall we do? Shall we add, multiply, divide, or subtract?" For example, in the problem, "What is the average daily wage of the boy who earns in one week \$2.00, \$3.00, \$2.50, \$2.75, \$3.00, and \$2.00?" many pupils pay no attention to the term *average* and are not sure of the operations to be performed. The task of the teacher is to develop in the pupil the habit of recalling the principle that applies to any problem and of considering the effect of each technical term employed in its statement; also the form of the statement. The teacher may follow these steps:

a. Ask questions directing the pupil's attention to the significant elements. The teacher should forestall guessing by asking thought-provoking questions, such as: What principle applies to this problem? What technical terms are used in stating the problem? What effect do these terms have on the solution of the problem? These and similar questions may be asked until the pupil forms the habit of recalling principles, interpreting the technical terms, and noting the form of statement of the problems.

b. Provide practice in recalling principles and in interpreting the technical terms. The teacher should provide abundant practice in reading problems and in stating what principle applies in each case. If the principles are not well understood the teacher should develop them carefully with the class. Of course, pupils cannot recall and apply principles that they do not understand.

c. Plan a solution. Too often pupils omit the second step and proceed, after a cursory glance at the problem, to guess at the operations to be performed. They want to be told just what operations to perform or they proceed by the wasteful trial-and-error method, hoping that they will hit upon the right procedure and thus arrive at the goal, the answer to the problem. Obviously, pupils need to be taught how to formulate a plan of procedure. On

this point Monroe[1] says:

> To do this the teacher should at first use simple problems, such as, "What is the area of a field 40 rods by 60 rods?" or, "What is the cost of 15 cows at $60 apiece?" and explain to the pupils that the words, "What is the area?" "What is the cost?" together with the form of the statement of the problem, tell one what operation to perform. The words used in stating a problem when properly understood tell one what the plan of solution should be. Occasionally it is necessary to recall rules or principles but these are suggested by the words of the problem. If this idea can be impressed upon a pupil, progress will have been made in teaching him to think.

Thus the pupil's attention should be directed to the technical terms and to the form of the statement of a problem, for, as Monroe has pointed out, it is these that tell one what operations to perform.

The pupil may be required to state what is given in the problem and what is required. This will direct his attention to the form of the statement.

Much practice in planning solutions should be provided. This practice may well be combined with practice in reading problems and in examining the data, for planning a solution involves both of these steps, or processes.

The teacher, then, can lead the pupils to estab-

[1]Monroe, W. S. *Measuring the Results of Teaching.* p. 172. Used by permission of, and arrangement with, Houghton Mifflin Company, the authorized publishers, New York.

lish the habit of carefully formulating a plan of procedure:

1. By leading them to see that the technical terms, together with the form of the statement, give the cues to the solution of the problem.
2. By requiring them to tell what is stated in a problem and what is required.
3. By providing plenty of practice, beginning with easy problems and proceeding as rapidly as the progress of the pupils will warrant to more difficult problems.

d. Verify the results obtained. One hundred per cent accuracy should be the standard in problem solving in arithmetic; but if this standard is to be attained, the results must be verified. An error in reasoning or a mistake in computation will invalidate the results. How frequently these mistakes occur! Furthermore, absurd answers are frequently given by pupils and by adults as well. The following instance is an illustration. A sixth grade was given this problem, "At the rate of $4 for an 8-hour day, how much is due a man for 6½ hours work?" A pupil gave this solution: "6½ multiplied by 4 equals 26; 26 multiplied by 8 equals $208, answer."

Such absurd answers are altogether too common; doubtless every teacher is familiar with this form of carelessness. Evidently, the results of reasoning cannot be accepted as final without verification. Consequently, the teacher should teach the pupils

the best methods of checking and proving results. An effort should be made to find out the methods in use in the business world and these should be taught the pupils. The following devices will prove helpful.

1. Estimate in advance the approximate answer. This will prevent absurd answers like the one recorded in paragraph *d*. For example, if the problem is to find the interest on $308 for one year at the rate of 6%, the pupil can estimate the approximate answer in advance; namely, $18. This will prevent his obtaining as a result $1.84 or $184. Either of these absurd answers may be obtained by misplacing the decimal point; estimating the answer in advance will enable the pupil to prevent his mistake.

2. Note whether the answer obtained meets the conditions of the problem. In the problem, "A house and lot together cost $5600. If the house cost three times as much as the lot, how much did each cost?" the pupil may offer a solution by the equation method or he may reason that, under the conditions of the problem, the lot would cost one fourth of the total, or $1400. Having obtained this answer, he can verify the result by noting that the house would cost three times this amount, or $4200, and that both house and lot would cost $5600, as stated in the problem.

3. Solve the problem by another method. For example, decimal fractions may be turned into their equivalent common fractions.

4. Check the addition processes by adding the columns in reverse order or by casting out the 9's.

5. Subtraction may be checked: (*a*) by adding the remainder to the subtrahend to obtain the minuend, and (*b*) by subtracting the remainder from the minuend to obtain the subtrahend.

6. To check multiplication: (*a*) interchange multiplier and multiplicand to obtain the same product; (*b*) divide the product by either the multiplier or the multiplicand to obtain the other factor; or (*c*) cast out the 9's.

7. Check division: (*a*) by multiplying the quotient by the divisor and adding the remainder, if any, to obtain the dividend or (*b*) by casting out the 9's.

e. Keep the pupil informed of his progress. A knowledge of results is as important in problem solving as in other types of learning. To obtain the best results the pupil must be kept informed of his progress. This may be done in two ways:

1. The teacher should administer one or more of the standard tests and inform each pupil of his score as well as the class scores. For example, Monroe's Standardized Reasoning Tests in Arithmetic may be given at the beginning and at the end of the school year to measure the year's progress. In addition, Stone's Reasoning Test in Arithmetic may be given at the beginning of the year and, to measure monthly progress, be repeated at the end of each month. The results should be represented objectively on individual and class graphs. Other standard tests may be used at the discretion of the teacher, but Stone's test will be found convenient because it can

be repeated as often as desired without additional expense.

2. The teacher should devise tests on the subject matter for the year and administer them frequently. These tests should be short-time tests; the papers should be graded as accurately as possible on a point scale and each pupil informed of his standing in the class. A graph should be constructed showing the highest, the median or average, and the lowest score of the class. (See Figure VIII, page 349.) The pupils should be taught how to construct these graphs and how to compare their scores with the class scores. Thus a pupil may know whether he is doing work of highest, average, or poorest quality.

Briefly, then, what should the teacher do in supervising problem solving in arithmetic?

1. Diagnose the ability of the class by administering one or more of the standard tests and by observing the pupils at work on problems.

2. Give corrective treatment according to the needs of the pupils. Teach them to do these things:

1) Grasp the meaning of the technical terms.
2) Visualize the conditions of the problem.
3) Formulate a plan of procedure, noting that the technical terms and the form of the statement give the cues to the solution of the problem.
4) Recall the principle that applies to the problem.

5) Verify the results obtained.

3. Keep the pupils informed of their progress through the use of standard tests and of tests devised by the teacher, representing the results graphically.

For a demonstration of how to provide for the foregoing factors, see experiment 5, chapter XIII.

II. Problem Solving in Other Subjects

Having considered problem solving in arithmetic, we turn now to problem solving in other subjects. Are the same factors involved in other subjects as in arithmetic? The purpose of this section is to explain briefly how to supervise problem solving in thought subjects other than arithmetic. Specifically, what can the teacher do to stimulate and guide the pupil's reflective thought processes?

1. Diagnose the ability of the pupils to think. The first step in the supervision of any subject is the diagnosis of the ability of the pupils who are to be supervised. It has been pointed out that ability to solve problems in arithmetic may be diagnosed fairly well by administering one or more of the standard tests; but in other thought subjects the problem of diagnosis is more difficult because no very satisfactory tests for measuring ability to think in these subjects has yet been devised and standardized. The teacher, however, can devise tests that will reveal something of the pupil's ability to solve problems in the various subjects. Further

information may be obtained by having the children state how they proceed, step by step, in solving certain problems. To this end have them write a paper describing their method of procedure. A careful examination of these papers will reveal something of each pupil's method of attacking a problem. Again, these papers and tests will reveal the wide range of individual difference that is to be found in almost every classroom.

2. Give corrective treatment. The second step is the application of remedial measures to enable the pupils to overcome their defects and to strengthen their good points. The consideration of this step will require a discussion of each of the essential factors of problem solving.

1) Locating and defining the problem. The pupil must locate and define a problem before he can think out a solution. The problem may arise naturally out of the give and take of the pupil's daily life or it may be presented to him by the teacher. The teacher's presentation may be as real and vital as the pupil's experience. In order that the problem may be real the pupil must be confronted with facts that appeal to him and that present an actual difficulty. For example, a teacher in economics might present the following table from the *Literary Digest* for June 30, 1923:[1]

[1]By permission of Funk and Wagnalls Company, publishers, New York.

TABLE XXIII. SHOWING THE NUMBER OF MILLIONAIRES IN THE UNITED STATES PAYING AN INCOME TAX OF ONE MILLION OR MORE FROM 1914 TO 1921

Year	Number of Persons
1914	60
1915	120
1916	206
1917	141
1918	67
1919	65
1920	33
1921	21

The question arises, How are these facts to be explained? Thus the teacher confronts the pupil with a real difficulty and arouses a vital interest. But the pupil must feel the difficulty and must locate and define the problem. This point will need special emphasis, for children have a strong tendency to set out without knowing what goal they intend to reach. How to teach them to read problems in arithmetic has been considered already; the need for locating and defining the problem in other subjects is no less urgent. A pupil can make no advance in thinking out the solution of a problem until he has felt keenly the real difficulty involved. When assigning a problem for study or a project to be worked out the teacher should make sure that

the pupils see just what the problem is or what the project involves. She should require them to formulate a definite statement of the problem. For example, the problem relating to the millionaires might take the form: Where are our vanishing millionaires hiding? or, Why did fewer persons pay an income tax of one million dollars (or more) in 1921 than in 1916?

The series of lessons relating to the earthquake in Japan presented in the previous chapter may be taken as another illustration of the way in which pupils may be led to locate and define their problems as the first step in the thinking process. Read again the account of this real schoolroom example of problem solving and note particularly how the teacher led the pupils to locate and define several problems pertaining to the situation caused by the earthquake of 1923.

2) Suggesting solutions of the problem. "Fertility of suggestion" is one trait of a good thinker. The more suggestions the pupil can make the more likely he is to hit upon the right solution. But a barren and empty mind cannot be fertile in suggestion. Suggestions spring from the already accumulated resources of one's past experience or from the data examined in the study of a problem. If the problem lies in a field already familiar to the pupil a solution may occur to him almost as soon as the prob-

lem is located and defined. Then he collects and organizes more data to test the validity of his hypothesis. If the problem lies in an unfamiliar field the pupil must collect and organize some of the data bearing on the problem as a basis for his suggestions. Pupils have a strong tendency, however, to guess at the solutions of problems, neglecting both their past experience and the data bearing on the problem. Mere guessing is not thinking. It is true that great thinkers make bold guesses or conjectures but they take their cues from a rich fund of accumulated experiences or from a careful examination of the data bearing on the problem. The tendency to guess blindly, therefore, must be counteracted. This may be done by teaching the pupil to search his past experience and to examine the data bearing on a problem for suggestions for solving the problem. J. F. Russell[1] says, "The scientific imagination, it must be remembered, is imagination working under the control of reason and for the ends of knowledge." Accurate knowledge of the given facts is prerequisite to the formation of serviceable hypotheses.

Stimulate fertility of suggestion, then, by teaching the pupil:

a. That he should search his past experience for facts and principles relating to the problem.

[1]Russell, J. F. *Elementary Logic.* pp. 183, 184. The Macmillan Company, New York. 1906.

b. That he should make a systematic search for data bearing on the problem as a basis for suggestions or for forming hypotheses.

c. That he should attempt to analyze a problematical situation into its simpler parts, picking out the essential elements. If necessary the teacher should ask questions that will lead the pupil to analyze the problem into its simpler elements.

3) *Evaluating the suggestions.* Suggestions must be evaluated in the light of the data bearing on the problem. Problems cannot be solved by the expression of mere opinion. Pupils must be led to see the necessity for data in the solution of a problem and taught how to collect and organize the data bearing on their problems. At first, it may be well to indicate the source of some of the best material. For example, if the topic is tuberculosis the assignment may well take the following form:

Problem: How can we aid in the campaign against tuberculosis?

Sources of Material:
Galbreath's *Playing the Lone Game, Consumption*
Brandy's *Facts About Tuberculosis*
McMurry's *A Health Program and Campaign Against Tuberculosis* (A Type Study)

Later the pupils should be taught how to find the data they need for the solution of a problem; then it will not be necessary to indicate the exact

sources of material. This instruction should include the use of dictionaries, atlases, and all other kinds of reference books. For the details of this type of work the reader is referred to such books as *How to Use Reference Books*, by Leon O. Wiswell, published by the American Book Company, or to *Lessons on the Use of Books and Libraries*, by O. S. Rice; Rand, McNally & Company.

Further, the pupil should be taught to evaluate suggestions in the light of his past experience. Frequently, he already has in his possession the facts and principles that will enable him to determine the validity of his inferences. At any rate, he should be taught to use whatever material is available from his accumulated fund of experience.

Much of the material collected from reading and recalled from past experience will be irrelevant to the problem under investigation. This material must be evaluated and the valuable parts selected and organized to show their bearing on the problem. Children are likely to become lost in details and they have a tendency to treat facts as if equal in value. What, then, can the teacher do to lead pupils to evaluate their suggestions in the light of the available data?

First, insist on the pupils' judging the worth of all materials from the viewpoint of their bearing on the suggestions that have been made or the con-

clusions that have been drawn. Pupils may be stimulated to evaluate their suggestions by asking questions, such as: How is this fact related to your suggestion? How will this material help you to decide whether you are right or wrong? Can you prove that your suggestion is correct? Pupils bringing in irrelevant material should be required to prove that their material is related to the suggestion under consideration. Thus they may be led to discover their error and to be on guard against the repetition of the same error.

Second, teach the pupils to examine the grounds of their beliefs, opinions, and prejudices and to refuse assent to all beliefs that have no secure basis in fact. Frequently, pupils rest content with unverified suggestions, regarding the problem as solved as soon as they are able to suggest a solution. Sometimes they insist on holding to the first suggestion even though valid reasons may be urged against it. Pupils must be taught therefore that beliefs, opinions, and prejudices have no validity unless they are supported by reliable data.

Third, teach the pupils to maintain a state of doubt until the evidence is all in. Suggestions must be evaluated by marshaling the evidence for and against them but argument must not be permitted to degenerate into a war of words in which the pupil is more interested in vanquishing an opponent

than he is in testing the validity of a conclusion. Teach him to avoid the pugnacious attitude and to cultivate a spirit of open-minded inquiry and a willingness to accept or reject a conclusion solely on the basis of evidence.

Fourth, teach the pupils to test the validity of a suggestion by experimentation, whenever this method is feasible. If the suggestion is valid the results demanded by the theory should actually be obtained in the experiment. To illustrate, the conclusions as to the best methods of memorizing poetry may be tested by arranging an experiment. From a study of the meager data bearing on this problem the conclusion may be drawn that the whole method is more economic than the part method. Now this conclusion can be tested experimentally. For example, two selections of poetry of equal length and of approximately equal difficulty may be memorized, one by the whole method and one by the part method, and the results recorded. By repeating this exercise several times the pupil can test the validity of the conclusion with respect to his own efforts at memorizing. If several children try this experiment conflicting results may be obtained, indicating that the efficiency of the method depends, in part, upon the pupil's habits of memorizing. Similarly, many other suggestions can be subjected to experimental treatment to determine their validity.

Fifth, teach the pupils to verify suggestions by appealing to authority. The pupils should be taught to look to reliable authors for a confirmation or rejection of their suggestions. This will cultivate a wholesome respect for the best writers in the various fields of learning.

Sixth, teach the pupils to criticize one another's suggestions. When a pupil makes a suggestion let the class pass judgment upon its validity, giving their reasons for accepting or rejecting the proposal.

4) Drawing conclusions. The suggestions that are accepted as valid should be summarized in the form of a sentence outline. Outlines may be built on the blackboard as the study proceeds but these should be revised as the suggestions are evaluated and accepted or rejected. Finally, the pupils should be required to formulate concise statements of the net results of their work. But at this point a pupil is prone to commit some of the common fallacies of reasoning, which should be pointed out to him. Among these are:

a. Noting successes and not observing failures. As one philosopher has expressed it, "We mark only when we hit." Some accidents occur on Friday; the conclusion is drawn that Friday is an unlucky day. No consideration is given to the fact that many events occurring on Friday have a happy termination. Likewise, an occasional dream may

come true. Consequently, many people are firm believers in the prophetic value of dreams, overlooking the hundreds that never come true. Thus successes are noted while failures pass unobserved.

b. Generalizing from insufficient data. Untrained thinkers have a strong tendency to draw sweeping conclusions from meager data. For example, some normal school graduates fail as teachers while a few untrained teachers succeed. From a few such cases the conclusion is drawn that normal school graduates as a class are inferior to the untrained teacher with several years of experience. Again, it is observed that a few red-headed persons are high tempered and the inference is made that all red-headed persons are high tempered. Similarly, it is observed that a few men with Ph. D.'s are no better teachers than other men with A. B.'s and the inference is made that higher degrees have no value.

c. Drawing conclusions on the basis of subjective interests. In many inferences the pupils' conclusions have their source in opinions and prejudices rather than in proof and evidence. Their belief in certain hypotheses is based on their mode of thinking and not on objective data. In such cases the pupils fail to distinguish between logical grounds for belief and psychological motives or causes. Even advanced students often fail to make this

distinction. For example, one student asserted that education could make a superior person out of an inferior one, disregarding all the data to the contrary.

The teacher should call attention to the foregoing fallacies and to others as these arise in attempts to solve problems. Thus the pupils may be made familiar with the common pitfalls of thinking and taught how to avoid them.

Finally, check up on the progress of the pupils and keep each pupil informed of his standing in the class. For this purpose use the standard test, if one is available, and tests devised by the teacher.

Summary of section. What, then, can the teacher do to stimulate and guide the reflective thinking of her pupils?

1. Have them locate and give definite formulation to problems growing out of their own experiences or out of data presented by the teacher.
2. Stimulate the pupils in suggesting solutions of the problem by teaching them:
    1) To consult their past experiences for facts and principles bearing on the problem.
    2) To make a systematic search for data bearing on the problem; also how to find material.
    3) To analyze their problems, picking out the essential elements in the situation.
3. Get the pupils to evaluate their suggestions. Teach them:

1) How to collect and organize the data.
2) To judge the worth of the data in the light of the problem.
3) To examine the grounds of their beliefs and opinions, rejecting those that have no secure basis in fact.
4) To maintain a state of doubt until the evidence is all in.
5) To test the validity of suggestions by experimentation, whenever this is feasible.
6) To verify suggestions by appeal to authority.
7) To criticize one another's suggestions.

4. Teach the pupils to draw conclusions cautiously.

5. Require them to give their conclusions a definite formulation and to organize them in the form of an outline or summary.

6. Check up frequently on the progress of the pupils and keep each pupil informed of his standing in the class.

III. Problem Solving and the School Subjects

In what school subjects should problem solving be an important phase of the work? Of course problems may arise in almost any subject but there are a few subjects in which this type of work is an important element. Of the elementary school subjects this is particularly true in arithmetic, geography, hygiene, history, and civics. Much of the work in agriculture and home economics should be organized around practical problems growing out

of the pupil's experiences. Most high school subjects afford abundant opportunities for problem solving. How to conduct this type of work will be illustrated in the case of some of the elementary school subjects.

1. Arithmetic

For an illustration of how to teach pupils to solve problems in arithmetic the reader is referred to chapter XIII, experiment 5. The plan of this experiment contains specific instructions to the teachers for directing pupils in learning to solve problems and the results indicate that the plan was effective.

Newcomb,[1] proposes a problem-solution sheet as a device for getting pupils to proceed systematically in solving a problem in arithmetic. His plan is to require the pupil to solve a number of problems using a problem-solution sheet. This sheet directs the pupil to read the problem carefully, state what is given and what is to be found, indicate the processes to be used, estimate the answer, finally solve the problem, and then check the results. By experimentation this method of procedure was found to be superior to the usual haphazard method.

This problem-solution sheet may well be used in connection with the plan outlined in chapter XIII, experiment 5.

[1]Newcomb, R. S. *The Elementary School Journal*. November, 1922.

2. Geography

One series of problem-solving lessons which should now be reviewed has been described already in the previous chapter. A second series of lessons is described in the following paragraphs. These lessons were taught by Miss Mildred Redfox, sixth-grade teacher in the Barrickville school, one of the training schools for Fairmont State Normal School.

Topic: Russia

In beginning the study of Russia the first step was to launch a problem of sufficient scope to require for its solution an extended study of the geography of Russia. First, the attention of the pupils was directed to a statement in the text that Russia had always been a backward nation but that since the war it is changing. Then a table was placed on the blackboard, giving the area and population of Russia in comparison with the leading nations of the world. It was found that Russia is one of the largest nations and one of the most populous. Out of these facts arose the problem: Why has Russia been a backward nation?

After the pupils had stated the problem they began to plan a method of procedure whereby they might reach a satisfactory solution. They offered several suggestions as to the cause of this backwardness:

1. Industries
2. Climate and surface features
3. Form of government
4. Type of education

5. Lack of natural resources
6. Religion
7. Lack of trade and intercourse with enlightened nations

After this preliminary discussion the class divided itself into groups for the purpose of following up and evaluating these suggestions. A chairman and a secretary were elected for each group. Then each chairman took charge of his group, assigning some particular phase of the problem to be worked out by each individual. The recitation time was spent in hearing and evaluating the reports of the various groups. When these reports were being presented the chairman of the group presided and called the individuals in his group to report their findings. If any of these findings were challenged and could not be answered they were referred to some member of the group to work out and report on at a later date. The secretary kept a record of the reports made and the questions left over for a later discussion. During the presentation of the group reports any member in the class had the right to challenge a statement or to raise a question that might occur to him. Frequently, pupils were called upon to justify their statements, and statements were accepted or rejected on the basis of proof so far as proof was available. Thus the various proposed solutions were discussed and evaluated by the class. After all the reports had been given, one class period was devoted to checking up on the solution of the main problem to see what had been accomplished. The conclusions were summarized in brief form as follows:

The backwardness of Russia has been due largely to the following factors:

1. Its position, which causes a lack of good harbors.
2. Its climate, which is unfavorable to development, the winters being long and cold and the rainfall in some parts scanty.
3. Its isolation. Until recently it has learned but little from other European nations.
4. The poverty and ignorance of the masses.
5. Its failure to develop its natural resources.
6. Its method of manufacturing by hand.
7. Its autocratic government.

In working out their problems the pupils had access to the following materials:

1. The class text, Frye's *Geography*
2. Parkins and McMurry's *Geography*
3. *Industries and Trades Which Bind Nations Together*, Part II, Social Science Pamphlets
4. Carpenter's *New Geographical Reader on Europe*
5. *The Literary Digest*, *Current Events*, and *The Pathfinder*

Not enough material was available to enable the pupils to answer all their questions satisfactorily, but they mastered the available material more thoroughly than do the pupils who follow the usual question and answer method. Moreover, they had received some training in systematic thinking. Note how this series of lessons provides for the processes of thinking, or problem solving.

3. History

The following history problem was worked out by the fourth-grade pupils of the Butcher School,

Fairmont, West Virginia, under the direction of Miss Willard Clayton.

A Fourth-Grade History Problem

The class had just completed a study of the early explorers and were ready to begin that of the struggle of the European nations to establish their claims in North America. The first step was to locate and define a problem that would stimulate the pupils to work over the material relating to this period with a strong interest which would provide a basis for the selection and organization of the important points. To this end the pupils made a list of the languages spoken in the period of exploration and also a list of the languages spoken today. Of course, English is the common language of the present day although many other languages may be heard within the borders of the United States. After some preliminary study and discussion the pupils were able to formulate a problem; namely: Why is the United States of America an English-speaking country?

The second step was to plan a method of procedure whereby a solution of this problem might be reached. The main problem was subdivided into a number of smaller problems:

I. What country had the strongest claim to the possession of North America?

   1) What countries claimed territory in North America?
   2) Upon what were these claims based?
   3) Why did people from these countries come to North America?

II. How were these conflicting claims settled or adjusted?

It was found that England, Spain, Holland, and France had strong claims in North America. Then the children divided themselves into four groups representing these nations. Each group was to present and defend the claims of the nation it represented. This led to a spirited discussion of the relative merits of the conflicting claims. Proof was required for each statement. Every pupil had to support his assertions with facts or his statements were adjudged worthless. The blackboard was utilized for charts on which the data were recorded in organized form. The outcome of all this study and discussion was to substantiate the statement that England had the strongest claim to land in North America. This was the answer to the first main question.

Having disposed of this question, the pupils proceeded to the second main question; namely: How were these conflicting claims settled or adjusted? The study of the problem led to the material dealing with the French and Indian War and the Treaty of Paris, by which France ceded to England much of her territory in North America. In the same treaty Spain ceded Florida to England. In working out this problem the pupils were divided into two groups, the French and the English. In a similar manner the pupils worked out the adjustment of the Spanish and Dutch claims, thus showing how England came into possession of Florida and New York. Some of the stirring scenes were dramatized.

The pupils had access to the following materials:

Gordy. *Stories of Early American History*

Perry and Price. *American History*
Compton. *Pictured Encyclopedia*
Bourne and Benton. *American History*
Book of Knowledge. Vol. 6
Redpath. *History of the United States*
Barnes. *Elementary History of the United States*
Montgomery. *A Beginner's American History*
Standard Dictionary of Facts
Montgomery. *Leading Facts of American History*
Peabody. *Our Country in Picture and Story*
Elson and Macmillan. *The Story of Our Country*
Robbins. *School History of the American People*

Finally, the pupils made a summary of the important points constituting a solution to their problem. They found that the United States is an English-speaking country because England succeeded in establishing her claims to most of the territory which is now the United States. The remainder was purchased by the United States, annexed, and secured by the War with Mexico.

Similarly, problems in civics, hygiene, and other subjects may be worked out by the pupils under the direction of the teacher. In this type of work the teacher should lead the pupils to locate and define important problems. Then she should stimulate and guide them in suggesting solutions to these problems and in evaluating the suggestions in the light of available data. As a result of this training the pupil should form the habit of systematic procedure in working out the solution to a problem and, finally, should become clearly conscious of the steps involved.

Furthermore, in this type of work the socialized recitation comes fully into its own. Some teachers have made efforts to conduct socialized recitations but have failed to create any vital social situations. They have the form but lack the spirit. In problem solving, however, the socialized recitation grows naturally out of a community of interest in some vital problem and out of group reports on phases of this problem and discussions of the phases. The social element is natural, not formal and artificial.

CLASS EXERCISES

1. How can a teacher train her pupils to read problems in arithmetic? Suggest definite methods and devices.
2. How can pupils be taught to plan solutions of problems instead of merely guessing at what to do?
3. How can the results obtained in solving problems in arithmetic be verified? Make a list of the most up-to-date and practical devices.
4. Work out a definite and detailed plan for supervising a class in problem solving in arithmetic. See chapter XIII, experiment 5.
5. Write a critical review of experiment 5. Does the plan of this experiment provide for all the essential factors of problem solving in arithmetic?
6. Make a plan for supervising a class in general science or some other subject of special interest to the student.
7. What devices may be used to get pupils to evaluate the materials collected in the study of a problem?

8. Make a list of the common fallacies of reasoning. Give illustrations of these fallacies. How can pupils be taught to avoid such mistakes?

9. How can the validity of suggestions and conclusions be tested? Make a list of devices for this purpose.

10. Make a summary of the main points in this chapter.

REFERENCES FOR CLASS USE

1. Book, W. F. *Learning How to Study and Work Effectively.* Chap. XVIII. Boston: Ginn and Company. 1926.
   (Specific suggestion on method of procedure in the investigation of a problem.)
2. Boraas, J. *Teaching to Think.* Chaps. X and XI. New York: The Macmillan Company. 1922.
   (A discussion of long problems and critical thinking. Suggests specific exercises designed to develop critical ability in reading.)
3. Branom, M. E. *The Project Method in Education.* Boston: Richard G. Badger, Publisher, The Gorham Press. 1919.
   (A good summary of various interpretations of the project. Presents the technique of problems and projects with special chapters on the manual arts, history, and geography.)
4. Breslich, E. R. "Supervised Study in Mathematics." *School Review.* XXXI: 733-747. 1923.

(Outlines general study habits and gives a list of strictly mathematical study habits; also a brief discussion of the technique of supervised study.)

5. Douglas, H. R. *Modern Methods in High School Teaching*. Chaps. X and XI. New York: Houghton Mifflin Company. 1926.
(Discusses the theory and technique of problem and project teaching.)

6. Hall-Quest, A. L. *Supervised Study in the Elementary School*. Chap. XV. New York: The Macmillan Company. 1924.
(A discussion of the problem and project type of work in arithmetic.)

7. Hotchkiss, E. A. *The Project Method in Classroom Work*. Boston: Ginn and Company. 1924.
(Part I is a concise summary of the principles underlying project work. Part II outlines several projects as actually worked out in the classroom.)

8. Hosic, J. F., and Chase, Sara E. *Brief Guide to the Project Method*. Yonkers-on-Hudson, N. Y.: World Book Company. 1924.
(Part I is a good presentation of the theory of the project method. Part II is devoted to sample projects. Part III gives helps for project teachers. A good handbook for teachers.)

9. McMurry, C. A. *Teaching by Projects*. New York: The Macmillan Company. 1920.
(An excellent discussion of specific projects. Treats the type study as a project.)

10. Parker, S. C. *Types of Elementary Teaching and*

Learning. Chap. X. Boston: Ginn and Company. 1923.

(An excellent discussion of problem solving. Describes actual lessons illustrating this type of work, and gives five specific rules for conducting problem-solving lessons.)

11. PREPER, C. J. "Supervised Study in Natural Sciences." *School Review.* XXXII: 122-133. 1924.

(Describes rather definitely the method of conducting supervised study in natural science in the University of Chicago High School.)

12. RICE, O. S. *Lessons on the Use of Books and Libraries.* Chicago, Ill.: Rand, McNally & Company. 1920.

(A good handbook for teachers.)

13. SIMPSON, MABEL. *Supervised Study in History.* New York: The Macmillan Company. 1918.

(Contains several illustrative lessons.)

14. SUMNER, S. C. *Supervised Study in Mathematics and Science.* New York: The Macmillan Company. 1922.

(The application of supervised study to mathematics and science with illustrative lessons.)

15. STEVENSON, J. A. *The Project Method of Teaching.* Chap. VIII. New York: The Macmillan Company. 1921.

(The application of the project method to several school subjects.)

16. WISWELL, L. O. *How to Use Reference Books.* New York: American Book Company. 1916.

(A valuable guide to the use of reference books.)

17. WILSON, ESTALINE. "Improving the Ability to Read Arithmetic Problems." *The Elementary School Journal.* XXII: 380-386. 1922.

(Gives devices for teaching pupils to read problems.)

NOTE: For additional material see the books on the teaching of history, geography, civics, and the sciences.

CHAPTER XI

FACTORS OF APPRECIATION

Questions to Be Kept in Mind When Reading

1. What are the main factors in appreciation?
2. What is the chief aim in teaching literature? Is it enjoyment or the enrichment of one's experience?

The meaning of appreciation was set forth in chapter IV, section IV, which should now be reviewed in preparation for the study of this chapter. The specific aim of the present chapter is to describe and illustrate the factors essential to appreciation. Literature will be treated as a typical subject. The specific problem may be stated thus: What are the factors essential to the appreciation of literature?

1. A background of knowledge and experience. A poem is fine, a picture beautiful, an action noble or base because of certain inherent qualities. One must be able to discern these qualities to appreciate them, for to appreciate them means to evaluate them at their true worth. The principle of apperception applies to appreciation as well as to other types of classroom activities. The pupil appreciates in terms of his apperceptive masses, his

background of knowledge and experience. To illustrate this point, take Walt Whitman's "O Captain! My Captain!" In an introduction to this poem Dr. Waitman Barbe[1] states:

> This remarkably fine poem will mean almost nothing to the young reader unless some explanation is given. Its author was a volunteer in the army hospitals at Washington during the Civil War. He knew and loved Lincoln, the great president, and this poem is a tribute to him. It is filled with two emotions—the feeling of patriotic joy over the results of the war and the feeling of personal grief for the death of Lincoln.
>
> In this poem he conceives of the nation as a ship. This ship has been on a fearful trip—the Civil War. He conceives of Lincoln as the captain of the ship. The fearful trip has been successful, and the shores are crowded with rejoicing throngs to welcome it home but, just as the port is reached, the captain (Lincoln) falls dead on the deck. Of course this refers to his assassination at the close of the war.

Note how much the information provided in the introduction contributes to the appreciation of the poem. With this background of knowledge it is easy to grasp the meaning of the poem and feel its strong emotions. Without such a background of knowledge appreciation would be difficult if not impossible. Likewise, in many selections of literature there must be a background of knowledge to provide a basis for appreciation.

[1] From Barbe's *Famous Poems Explained*. Published by Noble and Noble, New York. Used by permission.

Furthermore, the pupil must have had experience similar or closely related to the content of the selection to be appreciated. The pupil's own experiences provide him with his interpretative centers of thought and feeling. For example, parts of Whittier's "Snow-Bound" would mean little or nothing to a pupil who had never seen a snowstorm. He would be able to interpret the description of the snowstorm and the snow-covered landscape only in so far as familiar terms were used in picturing these scenes. Again, the imagery of "The Village Blacksmith" is taken largely from the blacksmith shop, and would have therefore very little meaning for a pupil who had never "looked in at the open door" and "heard the bellows roar." Moreover, one must have lived through some of life's trying experiences to appreciate the closing lines:

> Thus at the flaming forge of life
> Our fortunes must be wrought;
> Thus on its sounding anvil shaped
> Each burning deed and thought.[1]

So it is in all selections of literature: *Related experiences are essential to appreciation.*

2. **Analysis.** It is now commonly agreed that minute analysis, or dissection, kills appreciation by directing the attention to the details of a selection to the neglect of the larger phases. Nevertheless,

[1]Used by permission of, and arrangement with, Houghton Mifflin Company, the authorized publishers, New York.

breaking a selection up into its larger divisions usually aids in grasping the thought and in sensing the appropriateness of the elements of the technique. For example, a poem may be analyzed by proposing to oneself a few significant questions, such as:

1) What is the aim, or function, of this poem?
2) What is its central theme?
3) What feelings, or emotions, are appealed to?
4) What elements of technique has the author used?
5) What is the application of this poem to life situations?

Similarly, the principles of analysis may be applied to the short story, which, as Bolenius[1] has shown, falls into well-defined divisions: The introduction, the development, the climax, the conclusion. For example, "The Great Stone Face" may be analyzed thus:

1) Introduction: the legend of The Great Stone Face
2) Development of the story:
   a. Gathergold representing wealth
   b. Old Blood-and-Thunder, military fame
   c. Old Stony Phiz, eloquence
   d. The poet, genius

[1]Bolenius, Emma M. *Teaching Literature in the Grammar Grades and High School.* Chap. VIII. p. 211. Used by permission of, and arrangement with, Houghton Mifflin Company, the authorized publishers, New York.

3) Climax: Ernest, the preacher and seer, representing character
4) Conclusion: the fulfillment of the prophecy

An analysis like this enables the pupil to follow the development of thought as the author presents, in turn, the four lower ideals of wealth, military fame, eloquent statesmanship, poetic genius, leading up to the higher ideal of character built up through long years of striving toward a definite goal and expressed in social service. Furthermore, it reveals the form of a well-constructed short story and develops standards of judgment in this field.

As another illustration of the value of broad analysis, take Ruskin's "King of the Golden River," which may be analyzed as follows:

1) Introduction:
   a. The grandeur of the treasure valley
   b. The cruelty of two of the owners, Hans and Schwartz
2) Development of the story:
   a. The appearance of Southwest Wind
   b. Southwest Wind's kindness to Gluck and the anger of his brothers
   c. Southwest Wind turns the valley into a desert
3) Climax:

a. The King of the Golden River reveals to Gluck the secret of turning the river to gold

b. The elder brothers try to perform the miracle and fail

c. Little Gluck tries and is successful

4) Conclusion: The fertility and beauty of the valley is restored. "So the inheritance which was lost by cruelty was regained by love."[1]

Again analysis aids one in following the development of the thought and reveals the structure of a good story.

Similarly, other literary types may be analyzed so as to reveal their significant features from the standpoint of both content and structure. Analysis is therefore essential to appreciation and does the following things:

1) Aids in grasping the central theme
2) Brings into clear relief the elements of structure
3) Develops standards whereby one may judge of the excellence of a selection of literature.

3. The use, or application, of literature. What can literature do for the reader? What must it do for the reader in order that he may appreciate it? Upon this point the English teachers are di-

[1] Bolenius, Emma M. *Teaching Literature in the Grammar Grades and High School.* pp. 199, 200. Used by permission of, and arrangement with, Houghton Mifflin Company, the authorized publishers, New York.

vided into two apparently hostile camps. One group asserts that enjoyment is the chief aim in teaching literature whereas the other group maintains that one should read to enrich his experience. With respect to this division, Lincoln R. Gibbs[1] writes:

> Teachers of literature may be classified as amateurs and disciplinarians. The amateur understands his work to be that of inciting students to enter the fields of literature in quest of novel and refined pleasures. Within certain limits of decency and formal excellence one book is to him as good as another. Milton and Robert Herrick are on the same plane, both being superb artists whose writings yield an intense thrill. The educational function of literature is to break up the mental lethargy of the natural human animal, start in his mind a lively dance of images, sensations, and feelings, and provoke a spirit of mental adventure.
>
> I have called the other class of teachers disciplinarians. It is an ugly name and an inadequate one; but it emphasizes the main burden of this paper. I do not mean to identify the disciplinarian with the wielder of the birch, certainly; nor do I represent him as especially attached to the ancient doctrine of formal discipline, now almost universally discredited. The study of literature is the discipline of ideas in the sense that its serious object is to indoctrinate students with ideas of supreme worth and to give them practice in the critical treatment of such ideas. The art forms of literature, especially the great dramas and epics and the weightier examples

[1] Gibbs, L. R. "Preparation for Teaching Literature." *English Journal.* XI: 1-7.

of prose fiction, are of prime importance because they present the most comprehensive philosophy of life in the most accessible terms. . . . The special place of literature in the educational program is fixed by the fact that it is the most intellectual of the arts and therefore the best adapted to the critical evaluation of experience and to permanent moral effect. The old phrases of Matthew Arnold are still valid: "Poetry interprets life for us" and "Poetry and eloquence are the criticism of life."

Thus on the one hand we are advised to read literature for thrills, for adventure, for neurone vibrations, for pleasure, and on the other hand we are told that we should read literature to indoctrinate ourselves with great ideas and with lofty ideals. Which view shall we accept? Is it the primary function of literature to give a refined pleasure or to interpret life? Doubtless either view, taken alone, is extreme and unjustifiable but the "disciplinarians" are right in the main. Nevertheless, the "amateurs" are partly in the right, for there are some selections whose intrinsic function is to amuse, to entertain — in short, to give pleasure. To make pleasure getting the aim of all literature is however, a fatal blunder. Such a view overlooks a fundamental truth: namely, that pleasure is a by-product of other psychological processes: sensations, perceptions, images, and ideas. Pleasures are not independent entities. There are no end

organs of pleasure; hence pleasure can be obtained only indirectly. The surest way to miss pleasure is to make it a specific aim. Seek pleasure and it will evade you; think clearly and imagine vividly, and pleasure will be obtained as a valuable by-product.

Obviously, teachers of literature—particularly those who teach the pupils to read for pleasure—need to think out more clearly the goals to be attained. They need to ponder long the statement that pleasure, though a good in itself, can be obtained only as a by-product of activity on a higher plane. To despise pleasure would mean the adoption of a cruel philosophy, for legitimate pleasures enrich life. On the other hand the pedagogical epicureans who make pleasure an end and aim of the teaching of literature are likely to obtain little, if any, genuine pleasure while at the same time they miss the greater values. Furthermore, they lead their pupils to make reading an end in itself or a substitute for real experience. For example, they may spend their time reading love stories for pleasure, making this a substitute for a genuine experience as a hero or heroine in a real life story. Thus they may fritter away their time admiring paper men and women for their noble conduct, while they themselves become old bachelors and spinsters. Surely, it would be more educative, as

well as more pleasurable, to make reading a means of adjusting oneself to life situations! In other words reading should be a guide to the participation in the affairs of life instead of a substitute for real life. As Arnold Bennett[1] has so well said, one must translate literature into life to realize its values. His article in *The Bookman* on this point is so clear and forceful that I cannot refrain from quoting a few paragraphs:

Lo, a parable! A certain man, having bought a large, elaborate, and complete manual of carpentry, studied it daily with much diligence and regularity. Now there were no cupboards in his house; his dining-table consisted of an arrangement of orange-boxes, and he had scarcely a chair that was not a menace to the existence of the person who sat upon it. When asked why he did not set to work and, by applying the principles of the manual, endeavor to improve the conditions of his life and of the lives of his wife and children, he replied that he was a student, and he plunged more deeply than ever into the manual of carpentry. His friends at length definitely came to the conclusion that though he was an industrious student he was also a hopeless fool.

By which I wish to indicate that there is no virtue in study by itself. Study is not an end but a means. I should blush to write down such a platitude did I not know by experience that the majority of readers constantly ignore it. The man who pores over a manual

[1] Bennett, Arnold. "Translating Literature into Life." *The Bookman*. L: 98-100. George H. Doran Company, publishers, New York.

of carpentry and does naught else is a fool. But every book is a manual of carpentry and every man who pores over any book whatever and does naught else with it is deserving of an abusive epithet. What is the object of reading unless something definite comes of it? You would be better advised to play billiards. Where is the sense of reading history unless you obtain from it a clearer insight into actual politics and render yourself less liable to be duped by the rhetoric of party propaganda? Where is the sense of reading philosophy unless your own attitude toward the phenomena of the universe becomes more philosophical? Where is the sense of reading morals unless your own are improved? Where is the sense of reading biography unless it is going to affect what people will say about *you* after your funeral? Where is the sense of reading poetry or fiction unless you see more beauty, more passion, more scope for your sympathy than you saw before?

If you boldly answer, "I only read for pleasure," then I retort that the man who drinks whiskey might with force say, "I only drink whiskey for pleasure." And I respectfully request you not to plume yourself on your reading nor expect to acquire merit thereby.

But should you answer, "I do try to translate literature into life," then I will ask you to take down any book at random from your shelves and conduct in your own mind an honest inquiry as to what has been the effect of that particular book on your actual living. If you can put your hand on any subsequent period, or fractional moment, of your life and say, "I acted more wisely then, I wasn't such a dupe then, I saw more beauty then, I was kinder then, I was more joyous then, I was happier then—than I should have been if I had not

read that book"—if you can honestly say this, then your reading of that book has not been utterly futile. But if you cannot say this, then the chances are that the reading of that book has been utterly futile. The chances are that you have been studying a manual of carpentry while continuing to sit on a three-legged chair and to dine off an orange-box.

One can appreciate what he reads, then, only to the extent that he adjusts himself to the phase of life about which he is reading. Just as one must apply his knowledge of carpentry to realize its value, so one must practice the Golden Rule to derive any value therefrom. Mere reading is not enough; one must test this rule in actual practice in order to appreciate it. One cannot appreciate Hunt's "Abou Ben Adhem" by merely reading it. To appreciate this poem one must be governed in his conduct toward his fellow men by the high altruism which constitutes its central theme. Similarly, any selection of literature of any consequence must be applied to life situations to be appreciated, that is, must be translated into life.

What, then, should the teacher aim to accomplish through the teaching of literature? Certainly, she should not aim at pleasure unless the intrinsic function of the selection is merely to entertain and amuse. But most of the material taught in school has a higher aim, or function. What can literature do for the pupil? This problem has been dealt with

effectively by C. Alphonso Smith.[1] A few of the important points set forth by Doctor Smith will be reviewed briefly in this connection, but the reader is referred to the book itself for a full treatment of the problem.

1. *It can give one an outlet.* The pupil should find in literature an expression of what he has thought and felt but could not express. Great poets and prose writers have given expression to the fundamental thoughts and feelings of mankind. Lincoln's Gettysburg Address is read and reread because it gives expression to what we feel when we contemplate heroic self-sacrifice. "Whenever you say of a poem or story, 'That's what I have dimly felt before—but could never say,' freedom through expression has begun. The masters have found you and you have begun to find yourself."

2. *It can keep before one the vision of the ideal.* The study of literature may inspire the pupil to noble living by keeping before him worthy ideals and stimulating him to realize these ideals in his own life. What youth can appreciate "Excelsior" and not feel a strong impulse to resist all temptations and press on to accomplish some worthy aim in life? Likewise, "The Chambered Nautilus" should inspire the pupil to build "more stately mansions" as the years come and go. To keep before the youth the vision of high ideals is therefore one end point in the study of literature. The teacher should select a few of the poems and stories that inculcate high ideals and teach them to the pupil for the purpose of inspiring him to try to realize these ideals in his own life. It

[1] From *What Can Literature Do for Me?* by C. A. Smith. Published by Doubleday, Page and Company, Garden City, N. Y.

should not be forgotten that genuine appreciation is only attained by making the ideals of literature the ends and aims of one's own life.

3. *It can give a better knowledge of human nature.* Literature is a great laboratory of human nature. A poem or story always reveals something of the nature of its author and something, also, of the nature of the people who like or dislike it. Moreover, the great characters of literature typify the essential traits of human nature: love, growth, honor, sympathy, idealism, faith, fortitude, tolerance, coöperation. A study of the great characters of literature as the masters have portrayed them is therefore one of the best ways to broaden and enrich one's knowledge of human nature. To illustrate: Shakespeare's *Hamlet*, when rightly understood, is a clear and vivid portrayal of the vacillating type of human character. Hamlet is a young man, a scholar fresh from a great university. "The distinguishing thing about Hamlet is that he broke no moral law, violated none of the ten commandments, but yet vastly enlarged the area of wrongdoing." Hamlet brought about the final tragedy by his inaction, by what he failed to do. His education had made him reflective and emotional but had failed to establish habits of prompt reaction to life situations. He is typical of all who read but do not apply, of all who see the right but are never able to bring themselves to the point of acting on their good impulses. The tragedy of inaction, then, is vividly portrayed in *Hamlet* by the master delineator of human character. The student of human nature may be able to learn more from a few hours of study of this masterpiece than he could from several years of observation of the characters of real life, for it often takes years for a

tragedy to culminate in real life whereas life histories may be presented in one selection of literature.

Furthermore, one should study not merely to admire or pity the great characters of literature but also to inculcate in his own life the fundamental traits they typify. The study of *Hamlet*, for example, should result not merely in sympathy for a weak and vacillating character but in an attempt to inculcate in one's own life the habit of carrying into action his good ideas and noble impulses. Reading is therefore not an end in itself but a means to an end. The study of human nature in books is solely to the end that it may be better studied in life. A mere book knowledge of men and women will avail little—may be permanently narrowing—unless it is used as a means of seeing more in and more deeply into the life about us and within us. It is to real life what botany is to flowers, what astronomy is to the stars, what the world of the microscope and the telescope is to the world of the naked eye. It is not a substitute for real life, but an introduction to real life.

Thus literature may be made a means of adjusting oneself to life situations and this is what is meant by its use, or application. Moreover, it is only in the use, or application, of literature that it can be fully evaluated, that is, appreciated. Of course, there are some selections that have little if any adjustment value, such as nonsense material and humorous selections and stories that have no valuable thought content. The intrinsic function of this material is to amuse, to entertain, to afford

pleasure, and this is its use. It should be read when one needs rest, recreation, or mental play.

Summary

The chief factors in appreciation may be stated as follows:

1. A background of knowledge and experience. The pupil must have some knowledge of the background and setting of a selection and some familiarity with figures of speech and other elements of technique—in short, he must be able to grasp the thought content of a selection.

2. The analysis of a selection into its main elements. This analysis aids in grasping the central theme, brings into clear relief the elements of technique and structure, and develops standards whereby the pupil may judge of the excellence of a selection of literature.

3. Use, or application, to life situations. Literature should serve as an introduction to real life, not as a substitute for real life. It should be a means of adjustment to life situations; this is its main function. Use, or application, is the final standard of evaluation or appreciation.

CLASS EXERCISES

1. What is the meaning of appreciation? (Review section IV of chapter IV.)

2. What is the value of an introduction to a poem or story? Examine several sets of school readers to determine what use is made of introductions.

3. Examine Barbe's *Famous Poems Explained* and

note to what extent his introductions contribute to the appreciation of the poems. Are his introductions poor, fair, or excellent?

4. What is the value of analysis? Analyze a poem or story, as illustrated in this chapter, and note how the analysis contributes to the appreciation of the selection.

5. Criticize the following statement, "Over-analysis kills appreciation."

6. What is meant by the application, or use, of a poem or story?

7. What part does application play in appreciation? Illustrate by a poem or story.

8. Read Smith's *What Can Literature Do for Me?* and evaluate his main points.

9. What ends or aims should the teacher strive to attain in teaching literature?

10. Criticize the idea that one should read for pleasure. Examine some of the recent textbooks on psychology to determine the sources of pleasure.

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(Advocates more emphasis on the intellectual content of literature.)

2. Baker, F. T. "Studies in Appreciation." *Teachers College Record.* XXVIII: 117-145. 1926.
(Discusses the fundamental principles underlying appreciation, following the theory with concrete illustrations.)

3. Barbe, Waitman. *Famous Poems Explained.* New York: Noble and Noble. 1909.

(Contains good introductions to a collection of famous poems. A good demonstration of the value of a background in knowledge and experience.)

4. Bennett, Arnold. "Translating Literature into Life." *The Bookman.* L: 98-100. New York: George H. Doran Company. 1920.

(A convincing presentation of the idea that literature is an interpretation of life, that the reading of literature should result in modified behavior. Should be read by every teacher of literature.)

5. Bolenius, Emma. *Teaching Literature in the Grammar Grades and High School.* Chap. VIII. New York: Houghton Mifflin Company. 1915.

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based upon the judgment of the pupils as indicated on a rating scale for each objective.)

8. Gibbs, L. R. "Preparation for Teaching Literature." *English Journal.* XI:1-7. 1922.
(Advocates the idea that literature should indoctrinate the student with ideas of supreme worth. Objects to pleasure as an incentive or goal of reading.)

9. Kerfoot, J. B. *How to Read.* Chaps. IV and VI. New York: Houghton Mifflin Company. 1916.
(Chapter IV is an exposition of the idea that we read to get away from ourselves or to find ourselves. Chapter VI presents the idea that we read to discover the relationship of the world without us to the world within us. Both chapters show that we read with our apperceptive masses; both are thought provoking.)

10. Lyman, R. L. *The Mind at Work.* Chap. VII. Chicago: Scott, Foresman and Company. 1924.
(The place and value of cultural reading. Gives excerpts showing the value of good books.)

11. Opdyke, J. D. "Editing to Kill." *School Review* XXIII: 225-235.
(A good criticism of the tendency to overanalyze selections of literature, particularly scholarly editing. A plea for more of the author and less of the editor.)

12. Peters, C. C. *Human Conduct.* Chaps. I-V and XX. New York: The Macmillan Company. 1918.
(Chapters I-V deal with apperception as a process of enriching one's experience. Chap-

ter XX is a criticism of pleasure as an end of life. Should be read by all teachers of literature, particularly by those who are obsessed by the idea of reading for pleasure.)

13. Smith, C. A. *What Can Literature Do for Me?* Garden City, N. Y.: Doubleday, Page and Company. 1913.

(An excellent presentation of the values of literature. A good book for teachers to read.)

14. Woodberry, George. *The Appreciation of Literature.* New York: Harcourt, Brace and Company. 1922.

(A general treatment of appreciation in the field of literature.)

CHAPTER XII

SUPERVISING STUDY FOR APPRECIATION

Questions to Be Kept in Mind When Reading

1. How can the teacher provide for the factors of appreciation in the study of literature?
2. How can the study habits of pupils be diagnosed?
3. What reactions should the pupils make to a poem? A short story? A novel?
4. Can the appreciation of literature be measured on an objective scale?

What can the teacher do to help the pupil study more effectively in the field of appreciation? First of all the teacher must acquire clear and definite ideas of the meaning of appreciation and of the factors involved in this type of study. These topics have been considered already in chapters IV and XI and should now be reviewed in preparation for the study of this chapter. The second step is to apply this knowledge to the direction of the pupils as they study for appreciation. How this may be done is the main problem of the present chapter.

I. Literature as a Type

1. The selection of material. It must not be forgotten that the pupil interprets all selections

in the light of his own experiences. Consequently, there can be no appreciation unless the selection deals with a content within the range of this experience. In the elementary school the selection of suitable texts is therefore a problem of primary importance, for the teacher is usually compelled to use the adopted texts. She may select the best the text has to offer, however, omitting selections that are not well adapted to her class; the time thus saved may be devoted to the study of choice selections from supplementary readers. In this way the teacher may become an important factor in the selection of suitable material for study. To prepare herself for this phase of her work she should make a careful study of the kinds of literature best suited to the needs of pupils in the various periods of their development; otherwise, she will be unable to select wisely from the rich stores of available material.

In selecting material one fundamental principle that always applies is the principle of apperception: the pupil always interprets a selection in terms of his own past experience. Material must be selected that deals with some phase of child life or experience. A common mistake is to fail to distinguish between a child's poem and a poem about a child. For example, Field's "Little Boy Blue," a poem about a child but not a child's poem, is

frequently found in school readers. This poem deals particularly with parental affection and cannot be appreciated by a child. Of course, he may enjoy the lines that picture his familiar playthings but the poem's central theme and its deep emotion belong to adult life. Consequently, the child will fail in appreciation. The study of selections that are suitable to adults rather than to children is a positive hindrance to the development of appreciation. The practice engenders wrong habits of study and fails to arouse vital interests. The first problem is therefore the selection of suitable material. Not much progress can be made in teaching appreciation unless the material is wisely selected. Unfortunately, not much research work has been done to determine what selections are suitable for each grade, but a beginning has been made. One notable piece of work in this field is the preparation of *The Poetry Book* by Huber, Bruner, and Curry.[1] The method of preparing the series may be briefly summarized as follows:

The first step was to determine the poems which are now generally considered most appropriate for children of the various grades. This was accomplished (1) by considering the subjective opinions of expert teachers of poetry, and (2) by an examination of 900 courses of study and practically all of the most used textbooks, with mi-

[1] Huber, Miriam B., Bruner, H. B., and Curry, C. M. *The Poetry Book*. Vol. 9. Rand, McNally & Company. 1926. Chicago.

nute analysis of 30 courses of study and 30 textbooks, in each of grades one to nine. The resulting material formed two-thirds of that subjected to experimentation. From personal choice, previous studies and the opinions of experts in children's reading, additional poems were included, largely from modern poets and material not previously used in textbooks. The experimental material comprised 573 individual poems, increased to almost 900 titles through repetitions arising from the analysis of present practice.

The second step was to subject these poems to the test of use in actual schoolroom and teaching situations. The publishers furnished the material, printed in nine sections. Twelve experimental centers were carefully selected, in order to secure wide geographical distribution and to reach all types of pupils. More than 50,000 children and 1500 teachers were involved in the experiment. The method of procedure was such as to secure the most accurate measure of the children's interests in individual poems and to determine in what grades those interests were strongest. Twelve reaction papers were secured from each child and these data were treated statistically. Poems to the number of 535 were given definite grade placement, while thirty-eight poems were not tolerated by children. In the changes in placement from present practice about as many poems were raised to higher grades as were reduced to lower ones, and about the same number of differences in placement were found from the opinions of experts as from present practice in courses of study and textbooks.

The third step was the making of *The Poetry Book* in nine volumes, based upon the results of this elaborate study and experimentation. . . . . .

The results of this study have been embodied in a series of reading books in nine volumes for grades one to nine, one for each grade. These books are a valuable guide to material that has been demonstrated to be interesting to children. The method of selecting and arranging the poems may not be wholly valid, but it is far superior to the empirical judgment of any teacher.

In the high school the English teacher has a fine opportunity to select reading material on the basis of the pupil's needs and interests, provided she is not hampered by rigid prescriptions of the traditional and conservative type. The teacher should begin with the pupil's present reading tastes and interests and gradually lead him to a higher level, and not as some one has said, "Begin where the pupil is not and lead him where he does not want to go." Since the teacher has to deal with a diversity of pupils, rigid prescription of classics for study and outside reading cannot meet the needs of all. Some way must be found to provide for individual differences in literary tastes and appreciation. Several plans for making this adjustment have been proposed by progressive English teachers. A few of these will be outlined in the following pages.

1) Directing outside reading. Margaret Ashmun[1] presents a plan for directing the outside

[1]Ashmun, Margaret. "Library Reading in the School: Personal Guidance." *School Review.* XVIII: 270-273. 1910.

reading of high school pupils. She advocates beginning with the pupils' present reading interests and developing these into tastes and interests of a higher order. She says:

> One cannot transfer a healthy boy from *Six-Fingered Mike, the Cowboy King,* to George Eliot's *Middlemarch,* and expect on his part very enthusiastic acceptance of the change. . . . Accept his mental status and try him on *Treasure Island,* or *Phroso,* or *The Virginian,* or any other good or fairish piece of work with plenty of conversation in it, along with a large allowance of bloodletting, and swashbuckling, and hairbreadth escapes. Little by little he will come to read willingly a quality of literature that is acceptable and worthy, though not equal to the masterpieces.
>
> Similarly pursue the sentimental girl with the same tactics used on the boy. Lead her by the lure of semi-sentimental books toward something more healthful and virile.

2) *Reading to the pupils to stimulate their interest in reading.* Selections adapted to the age and advancement of the class are read to them, the usual "high-brow" discussions being omitted; then the pupils are permitted to select further readings on the basis of the interests aroused by the selections that have been read in class. In this manner it becomes easy for pupils to select their own reading material. With respect to this plan, Opdyke[1] writes:

[1] Opdyke, J. W. "Literature à la Carte." *School Review,* XXV: 101-112. 1917.

But there is a free and wholesome contagion that follows from the *à la carte, en masse* plan of presenting the gems of literature. And the results are vastly more permanent and impressive, even though they do sometimes come by the "doggerel" route. The laughs are bigger and grander; the "weeps" are deeper and wetter, and all the emotions between the two are truer and more spontaneous by virtue of the plan and the situation.

To put this plan into effect the teacher should begin with plain, simple fare and work up gradually to a more ambitious menu. Permit the pupil to select his own bill of fare but gradually develop his knowledge of literary dietetics so that he will be able to select wisely.

3) Substituting a reading club for the literature class. The main purpose of this plan is to develop the practice of reading good books and magazines intelligently. The class, under the direction of the teacher, organizes itself into a reading club. Each member of the club reads material of his own selection and reports from time to time to the class, which then discusses his report from any viewpoint that seems desirable. Considerable time is spent in discussing how to select reading material and how to plan one's reading of poetry, fiction, and other literature. "The point is to meet each pupil on his own level and lead him gradually by the *right literary steps for him* to a higher level."

The foregoing plans have been tried out and have been found to be fairly successful. Progressive teachers will use these or other plans to accomplish the main objectives: (1) to find out where the pupil is in his reading tastes and habits, and (2) to begin at this point to develop a taste for better literature. In many schools the choice of reading material is determined too much by tradition. The English teacher tends to be a "high-brow," having but little interest in anything except the classical. Much of the literature that pupils are required to read is too difficult for them to appreciate, too far removed from their experience. The plain duty of the teacher is to provide in some way reading material that is on the level of the pupil's native capacity and for which he has an adequate background of experience.

2. Finding how pupils study. The second step is to find out what pupils do when they are assigned a selection of literature for study. A good plan is to assign a suitable selection to be carefully prepared; provide a study period; then find out in the recitation period what the pupils did in preparing the lesson. This information may be obtained, in part, by observing the pupils as they study and, in part, by asking each pupil to write a paper stating all the things that he did in studying the selection. For example, a seventh-grade class was assigned a poem, "The Flag Goes By." No direc-

tions for study were given but the pupils were urged to make a thorough preparation for the recitation on the following day. When the time for the recitation came they were asked to write a paper on "How I Studied This Poem." Care was taken not to suggest any specific points to be discussed in the paper. A few typical responses, with the elimination of some mechanical errors, are given in full in the following paragraphs:

A

First I read the whole thing over three times. Then I recited as much as I could. I then studied the part I did not know until I could say it without a mistake.

B

I read it over. Then I asked my father all the words I did not know, and then I tried to get the meaning out of it.

C

I read the first verse over and then thought over what was in it. Then I read the next verse and thought over what was in it. Then I read both. I did the same with each one.

D

I read it over three times, then I looked at the helps to study and tried to answer all the questions, and if there were any words that I did not know the meaning of I looked them up in the back of the book.

E

I tried to get the meaning of it and I read it over two times and tried to get the meaning of it.

F

I read the poem over and then I tried to get it in memory, and I kept on trying to see if I could get it, but I didn't get it.

G

I read the poem over one or two times, then read the questions. Those I could not answer I looked up in the poem. I read about the poet and also discussed the words and phrases.

H

I read it over about ten times so I would not stumble over the poem. I learned to say the first and second verses by heart. I started to read to see how long it would take me and it took six minutes.

I

I read the poem over three times. I got the main points. I got the meaning of the poem.

There were thirty-five pupils in the class. The remaining responses were very similar to those presented in the preceding paragraphs.

The text used by the class provides some Helps to Study, consisting largely of questions on the selection. A few of the pupils made reference to these in their papers but more than 90% appear to have overlooked them entirely.

How were these pupils studying poetry? From an examination of their papers a few inferences are obvious:

1) Rote memorizing was the most important feature of study with nearly all pupils.

2) Much aimless repetition occurred. Several pupils read the poem three or more times, apparently with no specific aim in view.

3) The study of technique appeared only in the form of word study and in most cases this was omitted.

4) A few pupils only made use of the Helps to Study.

5) All the pupils in the class evidently needed specific instruction in how to study poetry.

Similarly, the teacher of any class may diagnose the pupils' method of studying and apply remedial measures according to their needs.

3. Corrective Treatment. The third step is teaching the proper methods of procedure in studying a selection of literature. The following points should be considered with the class as need for them arises.

1) How to discover the specific aim, or intrinsic function, of a selection. Effective study of any type requires a specific aim, a definite end point or goal, to be reached. The value of specific aims in reading was set forth in chapter VII. Definite aims are equally important in study for appreciation. The first step, then, in effective study is to discover the specific aim of a selection, its intrinsic function, or the author's reason for writing it. To this end teach the pupil to proceed in the manner indicated in the following paragraphs.

First, consider the title of the selection. In a few selections, at least, the title strongly suggests

the intrinsic function, or the aim, of the author; e. g., Matthew Arnold's "Self-Dependence," Edward Roland Sill's "Opportunity," or Longfellow's "Excelsior." In such cases time may be saved by getting one's bearings at the outset.

Second, if necessary, read the selection over once to determine the author's aim, or the intrinsic function. Note whether the selection has for its main content a great idea, humor, a story, or sense-experience. This will give a clue to the intrinsic function. If the selection contains a great idea the intrinsic function is to indoctrinate the reader with this idea; if it is merely humorous or nonsensical, the aim is to entertain or amuse; if it relates to sense-experience, the author aims to have you recall and revel in the delights of your past experience. In this manner the pupil may discover the aim of any selection assigned for study. But if the selection is difficult, if the meaning is not apparent, helps of some sort should be provided. Moreover, in the study of a long selection it may be wasteful of time and energy to read it over once to discover the intrinsic function. In such cases helps of some kind are not only legitimate but also highly desirable. In the following paragraphs are some helpful devices.

Third, study the circumstance that led the author to write the selection. In many cases this will give

a clue to the aim, or intrinsic function. For example, if a class is beginning the study of Bryant's "To a Waterfowl," they may be directed to find out what circumstance led to the writing of the poem. From Bryant's biography we learn that he had chosen law as his profession and that he was passing through a period of uncertainty and discouragement, for the future looked dark. The incident that led to the writing of this particular poem occurred as he was going to Plainfield to see what opportunities that town offered a young lawyer. While on his way, filled with doubt and uncertainty, he observed a solitary bird pursuing its course southward in the glow of the evening sky. He was deeply impressed with the scene and that night wrote "To a Waterfowl," in which he gave expression to his thoughts and feelings on this occasion. With these facts in mind the pupil should have little difficulty in determining the intrinsic function of the poem or in comprehending the central theme expressed in the following lines:

> He who, from zone to zone,
> Guides through the boundless sky thy certain flight,
> In the long way that I must tread alone,
> Will lead my steps aright.[1]

"Old Ironsides" by Oliver Wendell Holmes is another good illustration of the value of a knowl-

[1]Used by permission of D. Appleton and Company, publishers, New York.

edge of the occasion that led to the writing of the poem. In explaining the origin of this poem Searson and Martin tell us:

In 1828, after a glorious career, the old frigate was pronounced unseaworthy, and the navy authorities ordered that she be dismantled. This order met a general murmur of disapproval, which burst into a storm of indignant protest after the fiery heart of the youthful Holmes had dictated his remarkable lyric. His poet's eye sees the heroic old vessel sweeping proudly into port, her tattered flag at topmast, seemingly conscious of having lent herself to the protection of the bodies of heroes and to the preservation of human liberty but all unconscious of her impending fate at the hands of those who should be her friends. This impassioned appeal so charged the national heart that the poem was printed as a handbill and scattered broadcast in the streets of Washington. It is not remarkable that the order was rescinded and that, after being rebuilt in 1833, *Old Ironsides* kept her stately course as the historic queen of the American navy until 1855. Now, full of honors, revered and loved, she rides in safe anchorage in the Charlestown navy yard.[1]

With this background of information the average pupil would experience little difficulty in determining the intrinsic function of "Old Ironsides." Similarly, the intrinsic function of many other selections may be determined.

[1]Searson and Martin. *Studies in Reading* for the Eighth Grade. Used by permission of The University Publishing Company, Chicago.

Fourth, read an introduction to the selection. A good introduction reveals more or less clearly the aim of the author in writing the selection. It enables the reader to get the author's viewpoint at the outset and is, therefore, a great time saver. Material of this sort is beginning to be available in quantity. Some series of school readers provide brief introductions to most of the selections and good reference books are to be had. The following illustration is from Waitman Barbe's[1] *Great Poems Interpreted:*

The Deacon's Masterpiece; or, the Wonderful "One-Hoss Shay"

No other American poem is so generally misunderstood as Holmes's familiar "One-Hoss Shay." An examination of more than thirty references to it by as many critics and commentators, American and English, shows only one who sees in it anything more than fine fun and excellent Yankee humor. Everybody sees that, enjoys it, and praises it; but Professor Barrett Wendell sees in it also "one of the most pitiless satires in our language."

It is a satire on the logically constructed theology of early New England, especially that theology as formulated by Jonathan Edwards in his great work, *The Freedom of the Will.* As a feat of logical reasoning this work by Jonathan Edwards surpasses anything done by any other American writer. The unbending Calvinistic creed

[1] Barbe, Waitman. *Great Poems Interpreted.* Noble and Noble, New York. 1914.

as forged by Edwards seemed unanswerable and yet, in a hundred years, New England had turned away from it and had gone over very largely to Unitarianism. Edwards' great work was published in 1755. Notice the date. That was the year of the Lisbon earthquake and the defeat of General Braddock at Fort Duquesne, but these are mere incidents: they have nothing to do with the meaning of the poem, unless Holmes intends for us to think of the publication of Edwards' book as a calamity along with the other calamities of 1755! "The One-Hoss Shay" was published almost exactly a hundred years after *The Freedom of the Will:* that is to say, a hundred years after this perfectly constructed theological creed. Holmes saw that the creed had gone to pieces and rejoiced in the fact. His father had been a strong adherent of that belief but he himself was a Unitarian and he criticized the older creed in prose, in verse, and in speech, offending some, shocking others, but perhaps producing a tonic effect upon all.

All we have to do is to bear in mind that the "Deacon" stands for Jonathan Edwards and that the wonderful "One-Hoss Shay" stands for his system of theology, which was so perfectly constructed "that it couldn't break down"—but did—and we can see in the poem not only the finest flower of Yankee humor but also a satire that has but few equals for merciless keenness.

As Doctor Barbe has pointed out, even critics and commentators usually fail to see anything more than fine humor in this poem unless it is accompanied by an introduction. But, with a good introduction, the average reader can readily determine its intrinsic function. On the other hand it is

safe to say that most pupils, and many teachers as well, need such an introduction to nearly all poems and stories. More use should be made of this idea in preparing texts for use in the schools. Educators need have no fear of helping pupils too much, provided the help given is the kind that stimulates them to make a more vigorous and more intelligent reaction to the selection being studied.

How, then, can the teacher help the pupil to find the specific aim, or intrinsic function, of a poem or story? She can teach him to:

a. Consider the title of a selection, looking to it for a cue to the intrinsic function.

b. Read the selection once to discover the intrinsic function.

c. Study the circumstances that led to the writing of the selection.

d. Read an introduction to the selection if one is available.

2) How to master the content of a selection. The discovery of the intrinsic function of a selection is the first step in the mastery of its content. The pupil who has a clear notion of the aim is already well on the way to a mastery of the content. Further he should note that an author may aim to instruct and inspire or to entertain or to do both at the same time. If the intrinsic function is to indoctrinate the reader with a great idea, to convey emotion-

alized thought, the pupil should inquire just what the great idea is and what emotions are appealed to. If the intrinsic function is to entertain merely, is this done through a story, humor, or an appeal to sense-experience? If the selection has a valuable thought content the pupil should make an effort to grasp the central idea in its full meaning and significance. He should select the sentence or lines that best express the idea and he should state this in his own words, for an idea is never clearly grasped until it is definitely formulated. The pupil who says, "I know what it is but I can't tell it" has not grasped the idea clearly. The teacher should insist on a clear and definite formulation of the central theme of a selection. If the main content is humor merely, the pupil should read to sense the humor; if it is sense-experience, he should read to recall and enjoy the images of his own past experience. If the selection tells a story that has no valuable thought content the pupil should read to stimulate his own imagination to similar mental play. In short, the intrinsic function of a selection determines the type of reaction that the pupil should make to its content. Of course, most selections taught in school should have a valuable thought content but a few may well contain humor, some may be mere stories, and others may only appeal to sense-experience.

The teacher should direct the pupils, then, to observe the following points in mastering the content of a selection of literature:

a. Note whether the intrinsic function of a selection is to instruct or to entertain.

b. If the intrinsic function is to instruct read the selection over once to get the main idea. Select the sentence or lines that best express this idea; then state the idea in your own words, giving it a clear and definite formulation.

c. Note what emotions are aroused by reading the selection.

d. If the main content is humor read the selection to enjoy the humor and incidentally cultivate your own sense of humor.

e. If the main content is sense-experience read to recall and revel in the delights of your own sense-experience and to enrich your experience by combining your imagery in new and striking ways.

3) How to study form, or technique. In teaching literature many teachers make the mistake of beginning with a minute analysis of the elements of technique and of working laboriously toward a mastery of the content. In most cases, they stop short of any real comprehension of the thought and fail to arouse any strong emotion. Likewise, most of those who prepare editions of the classics for school use "edit to kill," approaching the content through an analysis of the elements of technique. Such over-analysis kills appreciation. This

order should be reversed. *From function to technique* is the fundamental principle that should be applied to material studied for appreciation. The elements of technique derive their significance from their function in giving effective expression to thought and feeling. How does a poet make his ideas attractive and impressive? In other words, what elements of technique does he employ?

Through the study of many poems the pupil should be led to discover the most important elements of technique; namely:

Imagery, or mental pictures
Appropriate rhythm and usually rime
Well-chosen words and phrases
Figures of speech or figurative speech
Stories, as in narrative poems

These elements of technique should be considered not as ends in themselves but as means of giving effective expression to the content of the selections.

Again, how does the short-story writer express himself effectively? Through the study of several stories the pupil should be led to discover the main features of a good story; namely:

a. An introduction that arouses interest in the situation

b. A development of the story through a number of incidents, each intensifying interest in the final outcome

c. A climax in which the various elements in the story come to an appropriate culmination

d. A conclusion that resolves the chief difficulties which have arisen in the development of the story

How, then, should the teacher direct the pupil's study of form, or technique? How much emphasis should be placed upon this study?

a. Adhere strictly to the principle "from function to technique." Study content first, giving attention to form only as it contributes to an understanding of the content.

b. Study form as a means of giving effective expression to content. Lead the pupil to see, for example, that the poet uses imagery to make his ideas clear and to arouse strong feeling.

c. Lead the pupil gradually to a knowledge of the most important elements of technique by having him observe these elements and their functions in the study of selection after selection until he is familiar with all the common elements of technique and with the function of each element.

4) How to use, or apply, a selection of literature. The function of literature has been considered already in chapter XI, which should be reviewed in this connection. In general, literature has a twofold application, or use: (1) it may be used as a means of adjustment to life situations, to interpret life or (2) it may be used as a means of mental recreation or play. But no matter which may be the function of any particular selection, use, or application, is the final step in its evaluation. Appreciation

requires application. For example, it is only those who have set before them some worthy purpose in life and are striving against all odds to accomplish this purpose that can really appreciate "Excelsior." To persons living with low aims in life the words of this poem are but "sounding brass and tinkling cymbals." Likewise, the "old fogy," the man with a backward look, could not value for its true worth the ideal expressed in the last stanza of "The Chambered Nautilus":[1]

> Build thee more stately mansions, O my soul,
> As the swift seasons roll!
> Leave thy low-vaulted past!
> Let each new temple, nobler than the last,
> Shut thee from heaven with a dome more vast,
> Till thou at length art free,
> Leaving thine outgrown shell by life's unresting sea!

On the other hand the man who is attaining continually higher levels of experience may be able to evaluate for its true worth the idea of progress as set forth by Holmes in this masterful poem. So it is with all selections of literature: one must live them to appreciate them.

With respect to use, or application, there are two general types of reaction that a pupil may make: (1) he may read for instruction and inspiration, to modify his own experience in the light of what he

[1]Used by permission of, and arrangement with, Houghton Mifflin Company, the authorized publishers, New York.

reads, to see more deeply into life—that is, read for profit; or (2) he may read to kill time, to while away tedious hours, for mental play, or recreation—that is, read for pleasure. Which type of reaction should the pupil make? The failure to consider this question has led to many and grievous errors in teaching literature. Some teachers make the fatal mistake of trying to teach all selections for pleasure, regardless of their intrinsic functions. By so doing they rob their teaching of most of its vitality and create in the minds of the pupils a dualism between reading for profit and reading for pleasure. They appeal only to the pseudo-emotions, as Thorndike has called the type of emotion aroused when one reads instructive literature merely for pleasure.

Furthermore, they inculcate false notions of the function of literature, associating it with leisure hours only, instead of with the whole business of living—both labor and leisure. Apparently, some think of literature as a kind of mental anaesthetic. These literary epicureans need to learn one of the elementary facts of psychology; namely, there are no end organs of pleasure. Consequently, pleasure is no proper end, or aim, for intellectual activity. Pleasure can be obtained only indirectly by stimulating the sense organs or the higher mental functions. The more vigorous and

thoughtful the reaction, therefore, the greater the pleasure to be obtained from the reading process. Reading for profit is more pleasurable than reading for pleasure.

Doubtless the course of study should include both types of selections—those that are read for profit and those that are read for mental play, or recreation—for the child needs mental play as well as physical play. But the teacher must distinguish clearly between the two types of selections so that she can guide the pupils in making appropriate reactions. What determines whether a selection should be read for pleasure or profit? Obviously, not the whim of the teacher but the intrinsic function of the selection. If the selection contains a worthy ideal it should be read for the inspiration to strive to realize the ideal in one's own life; if it is merely entertaining it should be read for recreation. In other words if the intrinsic function of the selection is to teach and inspire it should be read for profit; if it is to entertain or amuse, it should be read for mental play, or recreation.

To illustrate, "Which Loved Best?" contains an important idea; namely, the best way to express one's love is by helping to lighten life's burdens. This poem should be read to obtain this idea and to stimulate oneself to greater helpfulness and thoughtfulness. But "The Owl and the Pussy Cat" is merely enter-

taining, having no valuable thought content and should be read for recreation, or mental play. The intrinsic function of a selection, then, determines the type of reaction that the pupil should make.

Summary of section. What can the teacher do in supervising study for appreciation of literature?

1. Select material adapted to the interests and needs of the pupils. Apply the principle of apperception. Avoid "high-browism" in selecting literature.

2. Diagnose the pupil's methods of studying literature. Observe him at his study and have him write a description of his method.

3. Apply remedial measures according to the needs of the pupils. The following points may be considered with the class:

   1) To discover the aim, or intrinsic function, of a selection: (1) note whether the title gives any clue to the intrinsic function, (2) read it over once, (3) study the circumstances that led to its writing or read an introduction.

   2) In studying form, or technique: (1) apply the principle from function to technique; (2) study form as a means of giving effective expression to content; (3) lead the pupils gradually to a knowledge of the most important elements of technique by observing the function of these elements in the study of selection after selection.

   3) With respect to application, let the intrinsic function determine the use, or application. If the intrinsic function is to teach, read for

profit; if it is to entertain or amuse, read for pleasure.

II. Appreciation and School Subjects

Appreciation is the chief type of work in literature, music, and art. Of course, appreciation lessons may be taught occasionally in almost any subject. When an attempt is made to evaluate an idea, a point of view, or an attitude the process is essentially appreciation. In most subjects this type of work is only a minor element while in literature, music, and art, appreciation is the outstanding activity. The main objective in teaching these subjects is appreciation. Since almost all schools have music and art supervisors to direct the work in these subjects, no attempt will be made to treat these subjects in this connection. Appreciation in literature will be illustrated with a few concrete cases.

1. Literature Lesson in the Ninth Grade

Subject Matter: A Poem, "Abou Ben Adhem."

Assignment. In your study period work out answers to the following questions:

1. What was the author's aim in writing this poem?
2. What is the central theme? Give this theme a definite formulation and write out your statement.

3. What elements of technique has the author used to make his thought attractive and impressive?
4. What emotion is appealed to particularly?
5. Show how the main point in the poem applies to life situations.
6. Is the thought sound?

Study. Allow at least one study period for the pupils to work on this assignment. Pupils not able to complete the assignment in the study period should do additional work at home or in an extra study period. The study room should be equipped with the necessary reference books. A good introduction to the poem, such as may be found in Barbe's *Famous Poems Explained*, should be used. Directions for study may be given according to the needs of the class.

Class discussion. Then one class period should be devoted to a discussion of the questions in the assignment and to any others that may occur to the pupils in their study. They should be encouraged to express themselves freely and fearlessly, to be sincere in their reactions, and not be made to feel that they must say something that will please the teacher. Note that the questions are formulated so as to stimulate the reactions essential to appreciation.

(For further details of this type of work see chapter XIII, experiment 6.)

2. Study of a Novel

The following block of work on the Dalton Plan illustrates how the appreciation of a novel may be developed.

Block B

Silas Marner Grade 9 Time, Two Weeks

Teacher, Miss Sylvia Soupart

Foreword. *Silas Marner* is a novel that will repay a considerable expenditure of time and effort. I have taught it many times and find that after each study I am as enthusiastic about the book as I was when I first read it. Each time I find something new and eminently worth while.

The theme of the book is a universal one, the characters are varied and distinctive. The plot is compact and reaches points of tremendous interest; the setting presents typical English scenes of a hundred years ago most accurately and vividly. In addition to all this Eliot is a master of the English language. You cannot help falling under her spell if you read this book. She makes you think. Everyone ought to know *Silas Marner* and *Adam Bede*, two great English novels by George Eliot.

Directions for Studying *Silas Marner*

1. Read the whole novel through without paying any attention to the notes or questions. Then answer the questions in the book and on this paper. Reread the book if necessary and whenever necessary.

2. Note the theme, or underlying idea, at the opening of the novel. Show how Eppie brought "hope and forward looking thought" to Silas. Trace her influence on him from the beginning to the end of the story. Give definite examples of this influence. Show how the fact that Godfrey denied the child brought the opposite of "hope and forward looking thought" to Nancy and Godfrey.

3. Outline the *Marner plot* and the *Cass plot* with six points, or steps, for each. Where do the plots cross each other?

4. Are there any chapters that do not further the plot? Why are they introduced? How does this differ from the plan of a short story?

5. Characterize Silas, Eppie, Godfrey, Dunstan, Molly, Dolly Winthrop, Nancy, Aaron, Priscilla, and Squire Cass. Show that each grew stronger or weaker in character as the story progressed. What caused these changes? Were they sudden or gradual? (Read the chapter on character and characterization in Esenwein.)

6. Contrast Lantern Yard and Raveloe. Name some places around Morgantown that correspond in a general way to these places. Which place is your community most like? How would such a person as Silas Marner fare in your community? Do you know anyone that somewhat resembles him?

7. Select six bits of humor, six superstitions of the time, and six bits of Eliot's philosophy of life. What purpose does each of these serve in the story?

8. Note the use that George Eliot makes of very minute things, thereby giving them importance. List as many of these as you can and show their significance. For example, Godfrey's whip, Nancy's pincushion, the broken pitcher, Eppie's golden hair, and Silas's near-sightedness.

9. What problems of social importance does this novel present? What was wrong with the education of Godfrey and Dunstan, their home life, and the community in which they lived that might account for their failure in life? Could it have been prevented? How?

As another illustration we may consider a well-known short story, "The Great Stone Face," by Hawthorne.

3. Study of the Short Story

"The Great Stone Face" Grade 8

Assignment:

1. Read the story of "The Great Stone Face."
2. What is the aim of this story?
3. What is the theme, or underlying idea?
4. Make an outline of the story, showing the main divisions: introduction, development, climax, and conclusion.
5. Who are the main characters? How do they contribute to the development of the plot?
6. Formulate the main thought of the story. Is this thought true or false? Does one become like those whom he admires? What is your idea of what you would like to become? Is there danger of following false ideals? Give some illustrations.
7. Have you read any other story or poem having the same central theme? If so, recall or reread this selection and compare it with the present one.

Study. Allow two or three study periods in which to work out this assignment. Then devote two or three class periods to a discussion of the questions. Check up carefully on the written work required. Encourage the pupils to discuss the questions freely but require them to give reasons for their statements. Check up on the pupil's mastery of the content of the story by means of a test devised for the purpose.

CLASS EXERCISES

1. Make a sentence outline of the chapter.

2. Evaluate a set of school readers from the standpoint of the appropriateness of the selections. Are the selections adapted to the child's interests and his capacities?

3. How can the pupil's method of studying literature be diagnosed? Diagnose the methods of studying of one class.

4. Write out a set of directions you would give a class for studying a poem or a short story.

5. What is the fundamental principle to be applied to the study of form? Show how this principle applies to one poem or story.

6. What part does use, or application, play in appreciation? Illustrate with one selection.

7. Criticize the statement that pupils should be taught to read for pleasure.

8. How can one get the greatest pleasure from his reading? What is the source of pleasure in one's reading?

9. What determines whether a selection should be read for pleasure or for profit?

10. Make a list of poems that should be read for profit and a list of those that should be read merely for pleasure. Do this for short stories also. What is the essential difference in the character of the selections in the two lists?

11. How would you classify poems with reference to their content? Classify the poems listed in the preceding exercise.

12. What determines whether one should read for

profit or for pleasure? Make a rule for this that pupils may use.

13. Make copies of the Test for Measuring the Appreciation of Poetry, chapter XIII, page 519, and use it in testing a class.

14. This same test could be adapted to high school pupils by using a more difficult poem. Select a suitable poem for testing high school pupils and try the test out on a few high school classes. Summarize the results carefully.

15. Make a plan for improving the ability of a class to appreciate poetry. Try out your plan on at least one class. Do the same for the short story and the novel.

16. Formulate the fundamental principles involved in the appreciation of literature. Do these same principles apply to music and drawing? Prove, or verify, your conclusions.

17. Make a critical study of experiment 6, chapter XIII. Does this experiment provide for all the fundamental principles of appreciation in directing the work of the supervised-study group? Are the conclusions warranted?

18. Can the appreciation of poetry be measured? Make a critical study of the standard tests for appreciation.

REFERENCES FOR CLASS USE

1. Abbott, Allan, and Trabue, M. R. "Exercise in Judging Poetry." *Teachers College Record*. XXII: 101-126.

(An attempt to measure the pupil's ability to appreciate poetry.)

2. Ashmun, Margaret. "Library Reading in the School: Personal Guidance." *School Review.* XVIII: 270-273. 1910.

(Advocates beginning with the pupil's present interests and guiding him to higher and better types of reading.)

3. Barbe, Waitman. *Great Poems Interpreted.* New York: Noble and Noble. 1914.

(Contains good introductions to a number of great poems.)

4. Barnes, Walter. *Types of Children's Literature.* Yonkers-on-Hudson, N. Y.: World Book Company. 1920.

(Presents source material in convenient form for teachers.)

5. Douglass, Lucille. "Teaching English on the Dalton Plan." *English Journal.* XIII: 335-340. 1924.

(Explains how to organize a class on the Dalton Plan.)

6. Durkin, Margaret. "The Teaching of English on the Dalton Plan." *English Journal.* XV: 256-266. 1926.

(Contains a brief description of the Dalton Plan and explains how English may be taught according to this plan.)

7. Earhart, Lida B. *Types of Teaching.* Chap. X. New York: Houghton Mifflin Company. 1915.

(Discusses kinds of appreciation and offers suggestions for the arousal and guidance of appreciation.)

8. Green, W. H. "Comprehension in Literature." *English Journal.* XV: 765-772. 1926.

(An attempt to discover by the questionnaire method what valuable lessons pupils have learned from their study of literature. Selections portraying the great drama of life were found to have the greatest significance for pupils.)

9. Hall-Quest, A. L. *Supervised Study in the Elementary School.* Chaps. VIII and XXI. New York: The Macmillan Company. 1924.
(Chapter VIII on Reading and Literature presents methods of developing appreciation. Rich in illustrative material. Chapter XXI is a similar treatment of music. Both chapters contain bibliographies.)

10. Hayward, F. H. *The Lesson in Appreciation.* New York: The Macmillan Company. 1914.
(An extensive treatment of the appreciation of poetry and music with some attention to painting and sculpture.)

11. Huber, Miriam Blanton. "Children's Interests in Poetry." *Teachers College Record.* XXVIII: 93-104. 1926.
(Reports an investigation to determine children's interests in poetry. A valuable study.)

12. Jennings, Blanford. "Contracts in Literature." *English Journal.* XV: 663-672. 1926.
(Presents a plan for differentiated assignments in literature.)

13. Kerfoot, J. B. *How to Read.* Chaps. I and VIII. New York: Houghton Mifflin Company. 1916.
(Chapter I, on Learning to Read, treats reading as a form of living. Very illuminating. Chap. VIII is a very suggestive treatment of novel reading.)

14. McGregor, A. Laura. *Supervised Study in English.* Chap. IV. New York: The Macmillan Company, 1921.

(Contains several illustrative lessons. Presents a definite technique for supervised study in literature.)

15. Pendleton, C. S. "The Teaching of Poetry." *English Journal.* XIII: 310-324. 1924.

(Emphasizes the importance of intangible results in teaching English and presents twelve guiding principles for the teacher of poetry. It is a book which will be appreciated by the thoughtful teacher.)

16. Ruhlen, Helen V. "Experiment in Testing Appreciation." *English Journal.* XV: 202-209. 1926.

(Describes an experiment in Appreciation based upon "L'Allegro." Poem found to be too difficult for grade XI. Its appeal chiefly musical.)

17. Strayer, G. D. *A Brief Course in the Teaching Process.* Chap. VII. New York: The Macmillan Company. 1911.

(A good brief chapter on the lesson for appreciation.)

18. Webster, E. H. "The Teaching of Poetry." *English Journal.* XV: 587-599. 1926.

(Defines poetry and outlines a method of teaching based upon the essential elements of poetry.)

19. WILLIAMS, FLORENCE. "Poetic Appreciation through the Writing of Verse." *English Journal*. XIII: 380-388. 1924.

(Advocates teaching children to write verse as a means of developing appreciation of poetry. Samples of children's verses are given.)

NOTE: Much additional material may be found in the books on the teaching of English, which, for lack of space, have not been included in the foregoing list.

PART THREE

RESULTS

CHAPTER XIII

RESULTS OF SUPERVISED STUDY

Questions to Be Kept in Mind When Reading

1. Is the supervised-study plan of teaching superior to the usual recitation plan?
2. Is the method of conducting the experiments scientific?
3. Are the conclusions drawn valid?

The scientific attitude toward education demands that any proposed theory or plan of teaching justify itself on the basis of objective, measurable data. Theories must be tested and verified through carefully controlled experiments. To this end the principles of supervised study set forth in the previous chapters were first subjected to experimental treatment. The theories were tested out under actual schoolroom conditions and the results measured, in most cases, through the application of standard tests. Some of the results thus obtained will be reported in the following pages.

Will supervised study give better results than the usual recitation plan? This question should have been continually recurring to the mind of the reader. Statements should not be accepted merely on the authority of the writer, no matter how distinguished he may be. Proof, evidence, reliable

data should always be demanded. It was pointed out in chapter I that the older forms of supervised study failed to justify themselves on the basis of measurable results. But what of the newer forms? Does supervised study, interpreted as directed learning, prove its worth when subjected to experimental treatment? The following experiments provide some data upon which to base an answer to the foregoing questions.

Experiment 1. Fundamental Operations of Arithmetic

The aim. The aim of this experiment was to determine whether supervised study would give better results than the usual methods of teaching fundamental operations.

The subjects. The subjects participating in the experiment consisted of 45 pupils of the fifth grade of a small-town school. They were divided into two groups, designated Section A and Section B, numbering 23 and 22, respectively. With respect to age

Section	Average Age	Average Deviation	Percentage of Native Parentage
A	11.28	1.09	100
B	11.15	.73	95

and nationality the two sections were nearly equal, as shown here:

On Monroe's Standardized Reasoning Tests in Arithmetic the two sections made the following scores:

Section	Correct Principle	Correct Answer
A	18.7, P. E. 4.5	10.5, P. E. 2.8
B	18.7, P. E. 4.9	11.5, P. E. 3.0
Difference	.2	1.0
P. E. of Difference	1.4	.87

The two sections were therefore approximately equal in ability to solve problems (with a slight advantage in favor of Section B) as well as in age, nationality, and ability to perform the fundamental operations as determined by the initial test.

Two teachers, known as X and Y, coöperated in this experiment. These teachers held similar positions in the school system and received the same salary. Teacher X was a normal school graduate with one year's experience in teaching. Teacher Y had only an elementary school education, supplemented by two summer terms of special training for intermediate grade teaching and had eight years of experience in teaching. In so far, then, as teaching ability can be measured in terms of education,

teacher X had a considerable advantage over teacher Y but teacher Y had a like advantage over teacher X from the standpoint of experience.

The method of procedure. The Courtis Standard Tests in Arithmetic, Series B, and Monroe's Standardized Reasoning Tests in Arithmetic were administered to the whole group by the principal of the school. Then, on the basis of the scores made in these tests, the group was divided into two sections, known as A and B, approximately equal in size and in initial achievement. Teacher X directed the work of Section A, following the supervised-study plan, while teacher Y taught Section B according to the usual recitation plan. The following directions were placed in the hands of the teacher who was directing the supervised-study group:

1. Provide a twelve-minute daily practice period.
2. Use as practice material the Studebaker Economy Practice Exercises in Arithmetic.
3. Read carefully the Teachers' Manual for the Studebaker Exercises and follow the directions found therein.
4. At the beginning of the experiment inform each pupil of his standing on the standard tests and of his rank in the class.
5. Lead each pupil to set up definite standards to be attained by the end of the experiment.

Teacher Y taught Section B in her usual way,

using for practice the textbook material and special material that she prepared from day to day. She was fully aware of the nature of the experiment and made every reasonable effort to achieve good results with her group. The same amount of time was given to practice as in Section A.

The experiment continued for a period of six weeks. At the end of this time the principal repeated the Courtis Standard Tests with both sections, using the same form as in the initial test, and scored and tabulated the results.

The results. In tabulating the results the records of pupils who were not present for both the initial and final tests were eliminated. Only two records had to be eliminated from Section A and two from Section B. On the initial tests the two sections were still approximately equal in attempts but Section B was superior in "rights," particularly in subtraction and multiplication. For a summary of the results see Tables XXIV to XXVII.

TABLE XXIV. SHOWING THE MEDIAN SCORES FOR ATTEMPTS OF BOTH SECTIONS ON BOTH THE INITIAL AND FINAL TESTS

	Initial Test	Final Test
Section A	20.3, P. E. 4.3	30.4, P. E. 4.1
Section B	21.0, P. E. 4.5	24.0, P. E. 2.9
Difference	−.7	6.4
P. E. of Difference	1.31	1.17

TABLE XXV. SHOWING THE MEDIAN SCORES FOR RIGHTS

	Initial Test	Final Test
Section A	8.5, P. E. 5.4	16.5, P. E. 6.8
Section B	13.3, P. E. 3.7	15.0, P. E. 3.8
Difference	−4.8	1.5
P. E. of Difference	1.44	1.71

TABLE XXVI. SHOWING THE GROSS GAIN, PERCENTAGE OF GAIN, AND GAIN IN TERMS OF SCHOOL YEARS

	Gross Gain		Percentage		School Years	
	At.	Rt.	At.	Rt.	At.	Rt.
Section A	7.1	9.9	39	117	1.2	1.75
Section B	2.8	3.3	16	33	0.45	0.58

TABLE XXVII. SHOWING THE PERCENTAGE OF SECTION A EQUALING OR EXCEEDING THE MEDIAN OF SECTION B

	Initial Test	Final Test	Gain
Attempts	42.8	71.4	28.6
Rights	33.3	57.1	23.8

Conclusions. Note this brief summary:

1. The supervised-study group made greater gains than the unsupervised group and the difference is large enough to be significant, being from two to four times the probable error of the difference. (Statistical method

requires that for the difference to be significant it must be at least two times the probable error of the difference.)

2. The greater gain of the supervised-study group may be attributed, in part, to superior teaching ability on the part of teacher X (the comparative teaching ability of X and Y not being exactly determined) but it must be attributed largely to a better provision for the factors that make for rapid learning, particularly:

1) Setting up definite attainable goals.
2) Making a better provision for individual differences.
3) Devising a system of ready and accurate checking up on the pupil's performance.
4) Providing stronger motivation, due largely to the operation of the first three factors.
5) Arousing a strong interest in improvement. In every practice period the pupils were trying to excel the scores made on the previous day and to reach the standard set for the day's practice.

3. In terms of school years the supervised-study section gained nearly three times as much as the unsupervised section—a remarkable gain for six weeks of practice. In other words the supervised section gained more in six weeks than a grade ordinarily gains in a whole school year.

Experiment 2. Handwriting

The problem. Will supervised study applied to the learning of handwriting produce better results than the ordinary method of teaching writing?

The subjects. All the pupils, numbering 346, of

the sixth, seventh, and eighth grades of four different schools, participated in this experiment. The pupils in two of these schools constituted the supervised group while the pupils of the two remaining schools served as a control group. The supervised-study groups attended schools located in towns of about twenty-five hundred inhabitants, largely native American stock. The control groups attended a school located in a town of about fifteen hundred inhabitants and a ward school located in the residence section of a small city. The writing in the ward school was under the direction of a special supervisor, who had charge of the handwriting in all the city schools. The other schools had no special writing supervisors. How the two groups of pupils compared with respect to age and nationality is shown in Table XXVIII.

The teachers. Throughout the experiment each group of pupils was taught by the regular classroom teacher. Twelve teachers coöperated in this experiment, none of whom had any special training in the teaching of handwriting. The comparative teaching ability of the two groups could not be determined, however, with any fair degree of accuracy, since only rough measures of teaching efficiency were available, such as education and experience. How the two groups compared with respect to these measures may be determined from an inspection of Table XXIX.

TABLE XXVIII. SHOWING THE AVERAGE AGE, ENROLLMENT, AND NATIONALITY OF THE PUPILS PARTICIPATING IN THE HANDWRITING EXPERIMENT

Group	Grade	Av. Age	A.D.	Enrol.	Percentage of Foreign Parentage
Supervised	6	12.7	1.0	73	3
Control	6	11.7	0.95	51	2
Supervised	7	13.1	0.95	54	6
Control	7	12.6	0.98	53	2
Supervised	8	13.9	0.99	60	2
Control	8	13.3	0.88	55	2

TABLE XXIX. SHOWING THE RELATIVE AMOUNTS OF EDUCATION AND EXPERIENCE OF THE TWO GROUPS OF TEACHERS COÖPERATING IN THE HANDWRITING EXPERIMENT

	SUPERVISED		CONTROL	
Grade	Education	Experience	Education	Experience
6	Elementary	14	Normal	3
6	High School	15	Normal	3
7	Normal	1	Normal	10
7	Elementary	10	Normal	7
8	Normal	3	Normal	10
8	Elementary	34	Normal	11

It will be observed that the control group of teachers were all normal school graduates with three or more years of experience, whereas the supervised group, with two exceptions, were untrained teachers with ten or more years of experience.

The method of procedure. First, the four coöperating schools were studied with respect to the age and nationality of the pupils; then, on the basis of this study, two of the schools were selected for the supervised groups and the other two for the control groups. These groups were designated as A and B, respectively. In making the division the grades having the highest average age and the highest percentage of foreign parentage were placed in the A-groups, thus giving the B-groups a slight advantage so far as these factors were concerned. (See Table XXVIII.)

Since each grade coöperating in this experiment was taught by the regular teacher, it worked under normal conditions, as nearly as possible, throughout the period of the experiment. The A-groups followed a supervised-study plan, while the B-groups followed the usual routine of daily drills and practice in handwriting. Both groups devoted the same amount of time to the work; namely, fifteen minutes daily. The following written directions were given the teachers directing the work of the supervised groups:

1. Devote 15 minutes daily to handwriting.

2. With reference to position, teach these points:
   1) The forearm should be nearly perpendicular to the line of writing.
   2) The hand should face downward, with the wrist inclined not more than 45 degrees.
   3) The hand should slide on the fourth and fifth fingers.
   4) The grasp of the pen should be light, with the fingers moderately curved.
3. With reference to movement, teach that:
   1) The sideward movement across the page should be free.
   2) The writing movement may be a combination of the arm and finger movement.

4. Give drill exercises whenever needed to develop freedom and fluency in movement. (See the references on page 494 for these exercises.)

5. Rate each pupil's writing on both the Ayres and the Freeman scales at the beginning of this experiment and again at the close. (The specimens will be taken by the principal of the school in each case.)

6. Lead each pupil to set up definite standards to be attained by the end of the school year. For this purpose utilize the scores made on the standard scales and the standards for each grade.

7. Rate each pupil's writing on the Freeman Scale and keep him informed of his progress.

8. Have each pupil keep an individual record card for his monthly scores on the Freeman Scale and plot a graph showing his progress—individual and class.

9. Lead the child to analyze his own writing habits. Center attention on one important phase at a time.

Distribute attention among the various factors as follows:

First week: position and movement
Second week: uniformity of slant
Third week: uniformity of alignment
Fourth week: spacing and quality of line
Fifth week: letter formation
Sixth week: speed

At the end of the sixth week go back to position and movement and repeat the cycle, and continue the repetition to the end of the experiment. As soon as the standard is attained in any of these factors, discontinue special practice on that factor.

10. As far as possible, fit instruction and practice to individual needs.

11. Make your instructions brief and concise in order to conserve time for practice.

12. Insist on all written work being done in the pupil's best handwriting.

13. Keep notes on your daily work so that you can write a full and accurate account of the experiment.

14. Make constant use of the following references:

Freeman. *The Teaching of Handwriting*
Freeman. *The Handwriting Movement*
Monroe. *Measuring the Results of Teaching*
Taylor. *Supervision and Teaching of Handwriting*

No attempt was made to supervise the work of the control group of teachers, except to regulate the amount of time given to handwriting and to take specimens of the pupils' handwriting at the beginning and at the end of the experiment. The principal of the school took the specimens in each case. Each teacher devised her own plan daily.

The experiment continued from October to April, a period of six months. The progress of each grade was measured by the amount of gain on the Ayres Scale. The initial and final specimens were all rated by a board of five graders, none of whom, except the writer, knew what was the purpose of the experiment or which were the supervised groups and which the control groups. This board consisted of the writer and the following persons:

Frank S. White, an instructor in education in the Fairmont State Normal School and formerly a teacher of writing

M. H. Cole, principal of the White School, Fairmont, W. Va.

Ruth Cobb Shreve, a teacher of seven years' experience

T. C. Moore, an instructor in commercial subjects in the Fairmont High School, Fairmont, W. Va.

An effort was made to secure an impartial rating of all the papers. The graders were instructed to rate with care and to maintain the same standards throughout their grading. The computation of the coefficient of variability for each grader gave the following results:

Francis Shreve	.10
Ruth Cobb Shreve	.11
Frank S. White	.12
M. H. Cole	.12
T. C. Moore	.12

TABLE XXX. SHOWING THE MEDIAN SCORES ON THE INITIAL AND FINAL RATINGS FOR QUALITY

Group	Initial Test	Final Test
Supervised Study	39.3, P. E. 6.1	49.3, P. E. 9.3
Control	38.5, P. E. 6.8	40.0, P. E. 7.0
Difference	.8	9.3
P. E. of Difference	.83	.93

TABLE XXXI. SHOWING THE MEDIAN SCORES ON THE INITIAL AND FINAL TEST FOR RATE

Group	Initial Test	Final Test
Supervised Study	64.5, P. E. 14.1	78.3, P. E. 12.6
Control	71.0, P. E. 11.6	76.3, P. E. 11.2
Difference	−6.5	2.0
P. E. of Difference	1.66	1.53

TABLE XXXII. SHOWING THE PERCENTAGE OF THE SUPERVISED GROUP EQUALING OR EXCELLING THE MEDIAN OF THE CONTROL GROUP

	Initial Test	Final Test	Gain
Quality	53.3	66.6	13.3
Rate	43.3	55.0	11.7

TABLE XXXIII. SHOWING THE GROSS GAIN, PERCENTAGE OF GAIN, AND GAIN IN TERMS OF SCHOOL YEARS

Group	Gross	Quality Percentage	School Years
Supervised	10.0	25	2.5
Control	1.5	4	.4
		Rate	
Supervised	13.8	21	2.4
Control	5.3	7	1.0

The average of the five ratings was taken as the true score for each paper.

The results. Complete records were obtained from 246 pupils, 120 of which were in the supervised groups and 126 in the control groups. The records of 100 pupils had to be eliminated because they were absent from one or both tests. These were scattered rather uniformly through all the grades and apparently influenced the general results little, if at all. In order to make the groups equal in number and approximately equal in initial achievement, particularly in quality, six more records were eliminated from the control group, leaving 120 in this group. The results are summarized in Tables XXX to XXXIII.

Conclusions. The following statements give the conclusions drawn:

1. The supervised groups gained in quality approximately six times as much as the control groups and more than twice as much in rate.

2. The supervised groups made a proportional gain in both rate and quality, whereas the control groups made the normal gain in rate but less than half the normal gain in quality. Apparently, they gained in rate at the expense of quality.

3. In terms of school years the control groups gained slightly less than the normal amount for six months, while the supervised groups made more than three times the normal amount of gain.

4. The difference in the progress of the two groups is large enough to be of real significance, being from four to ten times the probable error of the difference.

5. The marked superiority of the supervised groups may be attributed, in part, to unequal teaching ability or to differences in learning among the pupils, but these factors are as likely to favor the one group as the other. (See Tables XXX and XXXI.) The greater gains of the supervised groups may be attributed, then, to a better provision for the factors affecting the rate of learning, particularly these:

1) The setting up of definite goals to be attained.
2) The provision for specific aims for each lesson or series of lessons, or to practice on the specific bonds to be formed.
3) The frequent checking of results by monthly ratings on the Freeman Scale and keeping each pupil informed of his progress.
4) The attitude of the pupils toward their daily practice, determined largely by the operation of the first three factors.

6. The results of this experiment are clearly in favor of supervised study. To accomplish as much in *six* months as schools ordinarily accomplish in approximately *twenty-two* months is a noteworthy achievement. It will be observed that the supervised groups gained 10 points in quality and 13.8 points in rate, whereas the normal amount of gain for one school year is 4 points in quality and about 5 in rate.

Experiment 3. Reading in the Fourth Grade

The problem. The problem was to determine whether supervised study or the usual recitation plan would give the better results in fourth-grade reading.

The subjects. All the pupils in two fourth-grade classes in the same school system served as subjects for this experiment. The supervised group had an enrollment of 32, with an average age of 9.3 years, while the control group had an enrollment of 36, with an average age of 9.6. The Otis Group Intelligence Test, Form B, was given to both grades with the following results:

Grade	Median Score	P. E.
Supervised, 4A	55.3	6.3
Control, 4B	56.0	4.6
Difference	.7	
P. E. of Difference	1.46	

The two grades were therefore approximately equal in general intelligence and consequently in learning ability, with a slight difference in favor of the control group.

The teachers. Two teachers, known as X and Y, coöperated in this experiment. These teachers were holding similar positions in the same school system but how nearly they were equal in teaching ability could not be determined with any fair degree of accuracy. On the basis of education and years of experience they ranked as follows:

Teacher	Education	Experience
X, Supervised	High School	9
Y, Control	Normal School	2

Teacher X had the advantage in experience but teacher Y had superior training. Since education has been found to be a more reliable measure of teaching efficiency than experience, especially after the first three years, it is probable that teacher Y had a slight advantage over teacher X.

The method of procedure. Teacher X directed the work of 4A, following a supervised-study plan while teacher Y taught 4B according to her own plan, the usual type of teaching in city schools. Both teachers gave the same amount of time to

reading: thirty minutes a day for twelve weeks. This time was divided into two daily periods of fifteen minutes each. The same text was used in both groups.

At the beginning of the experiment, Monroe's Standardized Silent Reading Test, Form 1, was administered to both grades. Then the teacher supervising the work of 4A proceeded according to the following plan:

1. The needs of the class were diagnosed on the basis of what the standard test revealed.
2. Pupils of similar ability were grouped together for the purposes of instruction. Three groups were formed: Group I, containing the pupils reaching or exceeding the standards in both rate and comprehension, numbering 7; Group II, those falling below the standards in both rate and comprehension, numbering 18; and Group III, the pupils failing to reach the standard in comprehension but exceeding it in rate, numbering 7.
3. Improvised tests, similar to the standard tests were given frequently and the pupils regrouped according to their relative attainments on these tests.
4. Remedial measures were applied that were designed to increase the rate of reading, particularly of Group II, such as:

    1) Selecting reading matter with easy vocabulary.
    2) Using timed sentence tests. These tests were graded and each pupil informed of his score. Graphs were made showing the progress of the group.

3) Using flash cards for phrase drills.
4) Having pupils read to see who could find the answers to questions most quickly.

5. Several measures were employed that were designed to increase comprehension, such as these:

1) Frequent word drills and studies were conducted to increase the pupil's vocabulary.
2) The meanings of words were studied and the words used in oral and written sentences.
3) Reading material was selected that made a strong appeal to the pupils.

6. An attempt was made to motivate the reading by utilizing the native interests. Pupils who enjoyed construction work were given written instructions to follow. Those who liked drawing were encouraged to illustrate poems and stories. All the pupils were urged to use the books and magazines on the reading table, selecting these according to individual interests.

7. The pupils were taught to find the central idea in a poem or story and to indicate the main divisions.

At the end of twelve weeks Monroe's Standardized Reading Test, Form 1, was administered a second time to both grades.

The results. After eliminating the records of all pupils not present for both tests and pairing off to equalize initial achievement, twenty-eight complete records were obtained from each grade. The results are summarized in Tables XXXIV to XXXVI.

TABLE XXXIV. SHOWING THE MEDIAN SCORES OF EACH GRADE ON INITIAL AND FINAL TESTS FOR COMPREHENSION

GROUP	INITIAL TEST	FINAL TEST
Supervised, 4A	7.9, P. E. 2.8	17.0, P. E. 4.4
Control, 4B	8.0, P. E. 2.5	10.6, P. E. 4.2
Difference	–0.1	6.4
P. E. of Difference	.7	1.13

TABLE XXXV. SHOWING THE MEDIAN SCORES THE INITIAL AND FINAL TESTS FOR RATE

Group	Initial Test	Final Test
Supervised	62.7, P. E. 11.5	86, P. E. 17.4
Control	56.0, P. E. 15.3	82, P. E. 17.4
Difference	6.7	4
P. E. of Difference	3.6	4.65

TABLE XXXVI. SHOWING THE GROSS GAIN, PERCENTAGE OF GAIN, AND GAIN IN TERMS OF SCHOOL YEARS

Group	Gross	Comprehension Percentage	School Years
Supervised	9.1	115	1.5
Control	2.6	33	.4
		Rate	
Supervised	23.3	37	1.1
Control	26.0	46	1.2

Conclusions. The section may be briefly summarized as follows:

1. The supervised group gained 3.5 as much as the control group in comprehension and nearly as much in rate.
2. In terms of school years the supervised group showed the same amount of superiority in comprehension with nearly as much gain in rate.
3. In comprehension, the chief aim of this experiment, the supervised group showed marked superiority, which probably should be attributed to the following factors:

1) Stronger motivation, secured through utilization of native interests, adjustment of the work to the capacity of the pupils, and frequent checking of results.
2) An attempt to diagnose the reading difficulties of the pupils and apply remedial measures where needed.
3) A better adjustment of the work to individual difference, accomplished by dividing the pupils into three groups according to their reading ability as determined by the standard tests.
4) A better provision for the factors of assimilative thinking as outlined in a previous chapter.
5) The attitude of the pupils, particularly the interest in improvement developed largely through the operations of the first three factors.

Experiment 4. History in the High School

The aim. The aim of this experiment was to determine which would give the better results in high school history, supervised study or the usual method of teaching history—by the unsupervised plan.

The subjects. The subjects for this experiment consisted of two classes in high school history: one in American history and one in modern European history, in the Fairmont High School, Fairmont, West Virginia. The American history class, numbering 59, was taught by Miss Elizabeth Koletka and the modern European class numbering 35, by Mr. H. Y. Clark.

Each class was divided into two sections, known as A and B, approximately equal in size, in mental ability, and in initial achievement in history. The division was made on the basis of the scores made on Terman's Group Test of Mental Ability, Form A, and a series of special tests in history devised in each case by the teacher in charge of the class and covering the subject matter that the pupils had studied the first half of the school year. Three tests of fifteen minutes each were given to each class on three successive days and the average was taken as the true score. The questions for these tests were framed so that each question required a definite answer and could be graded therefore with a fair degree of accuracy. Moreover, each teacher

made out a definite grading plan, indicating which answers would receive full credit and which only partial credit or no credit. The questions were weighed by allowing a certain number of points for each question answered correctly, the number of points for each question being determined by the difficulty of the question as estimated by the teacher.

The method of procedure. The experiment extended over a period of nine weeks, from March to May. In each case the teacher directed the work of Section A according to the supervised-study plan and taught Section B in the usual way. With Section A the 60-minute period was divided, approximately half of the time being allotted to the recitation and half to supervised study. Section B had 45 minutes for the recitation and 15 minutes for study without supervision.

An attempt was made to teach the pupils of Section A how to study history most economically. To this end emphasis was placed upon the following factors:

Reading with definite aims
Finding the main points in a chapter or section
Making outlines and summaries
Underscoring statements and making marginal notations
Exercising judgment in the selection and organi-

zation of material and in the interpretation of historical data
Using reference books
Making frequent reviews of all important points

Minimum, average, and maximum assignments were made to provide, in some measure, for individual differences in ability to do work. The assignments were definite and usually were in the form of questions or problems. The progress of the class was checked frequently by giving short time tests. The test papers were graded carefully and each pupil was informed of his standing. Graphs showing the standing of the class on each of these tests were made and exhibited and each pupil was encouraged to compare his standing with the class standing.

In Section A the teacher passed quietly from pupil to pupil during the study period, giving help according to individual needs, largely in the form of questions and suggestions.

At the close of the experiment another series of tests was given on the subject matter covered in the experiment. This series of tests was administered and scored in the same manner as the initial tests. All the tests, in both the initial and final series, were made long enough to keep every pupil busy for the full fifteen minutes and so difficult that no pupil would be likely to make a perfect score but, at the same time, so simple that the slowest pupil could make a few points.

In addition to the tests described in the preceding paragraphs Harlen's Standard Test in American History was administered to the two sections studying American history at the beginning and at the end of the experiment.

The results. Complete records were obtained from 30 pupils in Modern European History, 15 in each section, and from 55 in American History, 25 in Section A and 30 in Section B. Tables XXXVII to XL contain a summary of the results.

TABLE XXXVII. SHOWING THE MEDIAN SCORES ON THE SPECIAL INITIAL AND FINAL TESTS IN HISTORY

Section	Initial Test	Final Test
Section A	66.0, P. E. 9.1	82.4, P. E. 10.1
Section B	67.5, P. E. 9.0	68.5, P. E. 7.6
Difference	−1.5	13.9
P. E. of Difference	1.97	1.95

TABLE XXXVIII. SHOWING THE MEDIAN SCORES ON HARLEN'S STANDARD TEST (ONE GRADE ONLY)

Section	Initial Test	Final Test
Section A	62.5, P. E. 7.0	78.5, P. E. 8.6
Section B	66.0, P. E. 5.6	72.3, P. E. 6.9
Difference	3.5	6.2
P. E. of Difference	1.73	2.13

TABLE XXXIX. SHOWING THE GROSS GAIN, PERCENTAGE OF GAIN, AND GAIN IN TERMS OF SCHOOL YEARS

Section	Special Tests in History		
	Gross Gain	Percentage	School Years
Section A	16.4	25	
Section B	6.3	2	
	Harlen's Standard Test (One grade only)		
Section A	16.0	26	.5
Section B	6.3	10	.2

TABLE XL. SHOWING THE PERCENTAGE OF SECTION A EQUALING OR EXCEEDING THE MEDIAN OF SECTION B

	Initial Test	Final Test	Gain
Special Tests	47.5	66.7	19.2
Standard Test	36.0	68.0	32.0

Conclusions. From the study just described the following conclusions are drawn:

1. The results of this experiment are decidedly in favor of supervised study.

2. Since the two sections of each grade, the supervised and the unsupervised, were taught by the same teacher the superiority of the supervised-study sections may be attributed to the use of a better method rather than to superior teaching ability. In other words the A-sections made more progress because the fundamental

factors of assimilative thinking were better provided for in directing their work.

EXPERIMENT 5. Problem Solving in Arithmetic

The aim. The aim of this experiment was to determine which would produce the better results in problem solving in arithmetic, supervised study or the usual method of procedure in teaching this subject.

The subjects. The pupils of the fifth grade in two different schools were chosen as subjects for this experiment. These schools were located in small towns and about 95% of the pupils were of native American stock. Each grade was divided into two sections, known as A and B, approximately equal in size, in initial achievement, and in learning ability, on the basis of the scores made on an initial test with Monroe's Standardized Reasoning Tests in Arithmetic, Test II, Form I, and the scores made on the National Intelligence Test. On the latter test the two sections made the following median scores:

Section	No. of Pupils	Av. Age	Median	P. E.
A	31	11.58	88.0	14.9
B	32	11.68	88.5	9.4

The A-sections constituted the supervised-study group.

The teachers. Four teachers, one for each section, coöperated in this experiment. All of them, with one exception, were regular classroom teachers and had charge of the pupils they were accustomed to teaching. How these teachers compared with respect to education and experience is shown in the following table.

TABLE XLI. SHOWING THE RELATIVE AMOUNTS OF EDUCATION AND EXPERIENCE OF THE TEACHERS COÖPERATING IN EXPERIMENT 5

School	Supervised		Unsupervised	
	Education	Experience	Education	Experience
School A	Elementary	8	Normal	1
School B	College	15	High School	3

Whether the supervised sections or the unsupervised sections had the superior teachers cannot be determined from these data. From the standpoint of education and experience the teacher with a college education had a distinct advantage over the other teachers but this teacher taught pupils that were not members of his regular classes and dealt with a subject that he had not taught for ten years, his regular teaching being in the high school. Apparently, these factors more than overbalanced such superiority as was due to better training and more years of experience, for the teacher with only

an elementary education achieved better results with her section than the college-trained teacher did with his section.

The method of procedure. Both groups devoted thirty minutes daily to arithmetic and covered the same amount of text. The unsupervised teachers conducted their classes according to the usual method, working out their own plans and devices, while the supervised teachers worked according to the following instructions:

1. Diagnose the needs of the class:
    1) Administer Monroe's and Stone's Standard Reasoning Tests and analyze the results carefully.
    2) Observe the pupils at work on problems and note how they react when confronted with a problem.
    3) Have them write a paper on "How I Solve a Problem," and note how each pupil proceeds in solving problems.

2. Teach a series of forty lessons emphasizing in turn the following points:
    1) Reading the problem
    2) Examining the data bearing on the problem (technical terms, form of statement, and principles involved)
    3) Planning a solution
    4) Performing the necessary operations
    5) Verifying the results

3. In connection with the first two points under No. 2, test the pupils' knowledge of technical terms and teach the unknown terms. This test should be made from the technical terms used in the fifth grade—those found in the regular text or those that arise in daily classroom practice.

4. Provide as much practice as possible on each of the steps, or processes, as outlined under No. 2.

5. Check up on the progress of the pupils by testing them with Stone's test for measuring reasoning ability in arithmetic at the beginning, the middle, and the close of the series. Make a graph showing the standing of the class on each test. Have each pupil keep a similar graph showing the class standing and his own standing.

6. Explain to the pupils the meaning of the standard scores and lead each one to set up as a goal to be reached a definite number of points of improvement to be made during the experiment.

7. Repeat Monroe's Standardized Reasoning Tests in Arithmetic at the close of the series of lessons.

8. Read carefully pp. 157-174 of Monroe's *Measuring the Results of Teaching* and utilize the suggestions and devices contained in these pages.

For the purpose of securing greater accuracy and uniformity in administering the tests, the initial and final tests were given to both sections by the principal of the school and scored by the writer.

The results. Complete records were obtained from 63 pupils, 31 in section A and 32 in section B. The results are summarized in Tables XLII to XLIV on Pages 514 and 515.

TABLE XLII. SHOWING THE MEDIAN SCORES ON MONROE'S STANDARDIZED REASONING TESTS IN ARITHMETIC

	Correct Principle			
	Initial Test		Final Test	
	Sec. A	Sec. B	Sec. A	Sec. B
Median	15.0	14.5	19.5	16.0
P. E.	5.5	5.1	5.6	5.2
Difference	.5		3.5	
P. E. of Difference	1.3		1.4	
	Correct Answer			
Median	9.9	9.5	13.5	11.0
P. E.	3.0	2.8	2.7	2.7
Difference	.4		2.5	
P. E. of Difference	.73		.68	

TABLE XLIII. SHOWING THE GROSS GAIN, PERCENTAGE OF GAIN, AND GAIN IN TERMS OF SCHOOL YEARS

	Correct Principle		
	Gross	Percentage	School Years
Supervised	4.5	30	.6
Unsupervised	1.5	10	.2
	Correct Answer		
Supervised	3.6	36	.8
Unsupervised	1.5	16	.3

TABLE XLIV. SHOWING THE PERCENTAGE OF SECTION A EQUALING OR EXCEEDING THE MEDIAN OF SECTION B

	Initial Test	Final Test	Gain
Correct Principle	51.6	58.0	6.4
Correct Answer	53.9	74.2	20.3

Conclusions. The section may be briefly summarized as follows:

1. The difference in the medians of the two groups at the close of the experiment is small but large enough to be more or less significant, being 2.5 times the probable error of the difference in "correct principle," and 3.6 in "correct answer."

2. The greater gain of the A-sections may be attributed to better teaching ability on the part of the teachers conducting the supervised-study sections but it would seem more plausible to attribute it to the application of a superior method of teaching.

3. Apparently, the greater gains of the supervised-study sections were due to a more thoroughgoing application of the factors of problem solving, particularly of those that follow:

1) A more careful analysis of the steps involved in solving a problem.
2) Specific practice, in turn, on each of these steps or processes.
3) Frequent checking up on the progress of the pupils and keeping them informed of their progress.

Experiment 6. Poetry

The problem. The aim of this experiment was to determine which would yield superior results in the study of poetry, supervised study or the usual type of instruction.

The subject. The subjects for this experiment consisted of all the pupils, numbering 89, in three seventh-grade classes in a city of about eighteen thousand inhabitants. The pupils were all of American parentage and many of them came from the homes of the business and professional men of the city. These pupils were divided into two groups, known as A and B, approximately equal in mental ability and initial achievement. The division was made on the basis of the scores made on Terman's Group Test for Mental Ability and a special test prepared by the writer designed to measure ability to appreciate poetry. This test is described fully in the following pages. On the basis of these tests the A-group was selected for the supervised-study group and the B-group for a control group. The A-group was nearly twice as large as the B-group but the A-group was subdivided into two sections with a teacher for each section. How the two groups compared with respect to mental ability may be seen from an inspection of Table XLV.

The teachers. Three teachers coöperated in this experiment, two for the supervised group and one

TABLE XLV. SHOWING THE MEDIAN SCORES ON TERMAN'S GROUP TEST OF MENTAL ABILITY

	Group A	Group B
Number	56	33
Median	93	94
P. E.	21.1	14.1
Difference	−1.0	
P. E. of Difference	3.73	

for the control group. In so far as teaching ability may be measured in terms of education and experience the teachers of the supervised group were approximately equal to the teacher of the control group. All three were normal school graduates. On an average the teachers of the supervised-study group had taught 12 years—one 18 years and the other 6 years—whereas the teacher of the control group had taught 11 years.

The method of procedure. The following test for measuring the appreciation of poetry was devised and tentative standards established by giving the test in the seventh and eighth grades of five different schools. Records were obtained from 120 pupils in the seventh and 127 in the eighth grade. The seventh-grade pupils made a median score of 22 on the basis of 50 points for a perfect score and the eighth grade, a median score of 28. These medians

were used in measuring the progress of the groups in terms of school years, six points being taken to represent the normal amount of gain for one school year. The test was based upon Ben Jonson's "The Noble Nature" which reads as follows:

It is not in growing like a tree
In bulk doth make man better be;
Or standing long an oak, three hundred year,
To fall a log at last, dry, bald, and sere:
A lily of a day
Is fairer far in May,
Although it fall and die that night—
It was the plant and flower of Light.
In small proportions we just beauties see,
And in short measures life may perfect be.

This poem was typewritten and a copy placed in the hands of each pupil. The test blanks and the poems were distributed among the pupils at the same time. The test blank, together with the scoring key, is reproduced in the following pages.

Test for Measuring the Appreciation of Poetry

NAME_____ SCHOOL_____ GRADE____ AGE_____

(Place a copy of "The Noble Nature" in the hands of each pupil.)

Directions to the pupil:
Read this carefully, then do as directed below.
Be careful to do exactly as directed.

1. A poem may have as its main content any or all of these:

(1) An important idea (Thought)
(2) Humor (Fun)
(3) Sense-experience (Images of past experience, of sight, sound, taste, etc.)

Place a cross before the statement that best expresses the nature of this poem; e. g., if this poem contains an important idea, place a cross before No. (1); if it is a humorous poem, place a cross before No. (2); if it refers to familiar things but contains no central idea, place a cross before No. (3).

2. Select from this poem the two lines that best express the meaning. Write these lines in the space provided.

3. In giving effective expression to their thoughts and feelings poets commonly employ the following devices:

(1) Images or mental pictures
(2) Rhythm and rime
(3) Well-chosen words and phrases
(4) Interesting stories
(5) Strong and appealing characters
(6) Figures of speech

Place a cross before any of these devices that the author has used effectively in this poem. More than one may be marked.

4. A poem may arouse one or more of the following emotions:

(1) Joy or gladness
(2) Faith or trust
(3) Aspiration
(4) Admiration

(5) Patriotism
(6) Sadness or grief
(7) Love or sympathy
(8) Awe or mystery
(9) Hopeless despair

Place a cross before any of the preceding points that tell how this poem makes you feel. More than one may be marked.

5. A poem may be used in any of the following ways:

(1) Read for enjoyment
(2) Read to modify one's own conduct
(3) Read to others for their instruction and enjoyment
(4) Used as a basis for language and grammar lessons
(5) Memorized to be quoted to others

Place a cross before any of the preceding statements that tell how this poem should be used. More than one may be marked.

The scoring was done on the basis of 50 points for a perfect score and the points were distributed arbitrarily among the exercises as follows:

Number of Exercise	Points Allowed
1	15
2	10
3	10
4	10
5	5
Total Points	50

The time allotment was 12 minutes.

The papers were scored according to the following plan:

Scoring Key

Exercise 1: perfect score 15 points
(1), or (1) and (3), marked 15 points
(3) alone 2 points
(2) alone 0 point

Exercise 2: perfect score 10 points
Lines 1 and 2, 3 points
Lines 9 and 10, 10 points
Line 9 or 10 alone, 5 points
Other lines, no points

Exercise 3: perfect score 10 points
(1), (2), (3), and (6), 10 points
(1) and (2), 3 points
(3) or (6) alone, 1 point each

Exercise 4: perfect score 10 points
(1), 2 points
(3) and (4), 4 points each
Other numbers, no points

Exercise 5: perfect score 5 points
(1), (3), and (5), 1 point each
(2), 5 points
(4), 0 point

Each of the three grades acting as subjects for this experiment was tested on the preceding scale. The teachers of the A-group directed their pupils according to the supervised-study plan outlined in the following paragraphs for a period of ten weeks,

three periods per week, 30 minutes in length. Meanwhile the teacher of the B-group gave the same amount of time to the teaching of poetry and taught the same poems, following her own plan and devices. At the end of the period both groups were tested a second time with the Test for Measuring the Appreciation of Poetry and the progress of each group measured in terms of the gain made over the records on the initial test. Both the initial and final tests were administered and scored by the writer.

The supervised-study group was directed according to the following plan:

The needs of the class were diagnosed by assigning for careful preparation "The Flag Goes By" and, in the following class period, having the pupils write a paper on "How I Studied This Poem." These papers were collected and examined carefully to determine how the pupils reacted when they were assigned a poem for study. Also, observations were made of the children while they were studying a poem to try to discover their methods of studying. It was found that the method most widely employed by these pupils was verbal memorizing. A few directed their attention to the meaning of words. Definite aims were almost entirely lacking. For a further discussion of the methods of study of these pupils, see pages 452-455.

The corrective treatment provided for both instruction and practice that covered the weak points

of the class. First, instruction was given in the proper methods of procedure in studying a poem. This instruction dealt with the fundamental elements of procedure in studying poetry; namely:

How to discover the aim or intrinsic function of a poem
How to master the content of a poem
The attention that should be given to elements of technique
The use, or application

All of these points were illustrated by applying them to the poem under consideration. Then the pupils were given practice in applying these principles to the study of other poems. Definite assignments were made in the form of questions, of which the following list on "The Landing of the Pilgrims" is typical:

What was the author's aim in writing this poem?
What is the central idea?
What stanza or lines best express this idea?
What mental pictures, or imagery, does the poem contain?
What feeling or emotion does it arouse in you?
How would you use this poem?

In a similar manner fifteen poems in all were considered with the class, two class periods on an average being allotted to each poem.

With respect to content these poems were grouped in three classes:

1. Poems containing a great idea, a valuable thought content; e. g., "Abou Ben Adhem."
2. Humorous poems; e. g., "The Height of the Ridiculous."
3. Poems having sense-experience as the main content; e. g., "October's Bright Blue Weather."

Some attention was given to the elements of technique commonly employed by the poets: imagery, rhythm and rime, well-chosen words and phrases, interesting stories as in narrative poems, strong and appealing characters, and figures of speech, particularly similes, metaphors, and personifications.

Also, the feelings, or emotions, aroused by poetry were considered. A list of the more fundamental emotions was made in order to teach the pupils what to look for in noting the emotions aroused. This list included joy or gladness, sadness or grief, faith or trust, aspiration, awe or mystery, love, sympathy, admiration, despair, and patriotism. In connection with each poem studied the pupils were asked to note the chief emotion aroused.

The use, or application, of poetry, also received careful consideration. It was brought out in these discussions that poems containing great ideas and ideals should be used to give insight into life, to modify one's own conduct in the light of what he reads, whereas poems containing humor merely or sense-experience should be read for recreation, or mental play.

The results. The results are summarized in Tables XLVI to XLVIII. It should be noted that the pupils were not tested on the poems studied in the course of the experiment, but on a test designed to

TABLE XLVI. SHOWING THE MEDIAN SCORES OF BOTH GROUPS ON THE INITIAL AND FINAL TEST FOR APPRECIATION OF POETRY

Group	Initial Test	Final Test
A, Sup. Study	23.5, P. E. 6.3	29.5, P. E. 5.6
B, Control	23.5, P. E. 5.7	24.7, P. E. 5.5
Difference	0.0	4.8
P. E. of Difference	1.3	1.21

TABLE XLVII. SHOWING THE GROSS GAIN, PERCENTAGE OF GAIN, AND GAIN IN TERMS OF SCHOOL YEARS

Group	Gross Gain	Per Cent Gain	Gain in Terms of School Years
A	6.0	26	1.0
B	1.2	5	.2

TABLE XLVIII. SHOWING THE PERCENTAGE OF GROUP A EQUALING OR EXCEEDING THE MEDIAN OF GROUP B

Initial Test	Final Test	Gain
50	67.9	17.9

measure their ability to appreciate poetry. The gain represents therefore not an increase in specific knowledge of the poems studied but an increase in the ability to appreciate poetry.

At this point it may be of interest to compare the papers on "How to Study Poetry" written at the beginning and at the close of the experiment, even though such a comparison may have no scientific value. Two sets of these papers are reproduced in the following paragraphs. They are typical papers of about median grade.

The paper written by L. L. at the beginning of the experiment on "How I Studied This Poem":

I read it over first. I looked up all the words I didn't know the meaning of. I read the biographical sketch over, then I tried to answer the questions in the book.

The paper written by L. L. at the close of the experiment, on "What I Have Learned about How to Study Poetry":

I have learned many things about how to study poetry. I used to read poems just because I had to but now I enjoy them. I have learned how to find the aim and the main idea, to enjoy the rhythm and rime. I can see the well-chosen words and phrases. I am able now to state the good qualities of a poem. I can tell what emotions are aroused.

Papers on the same subjects written by J. A. at the beginning and at the close of the experiment:

At the Beginning

I read it over two or three times. Then I closed the book to see if I could repeat the words.

At the Close

I know now how to get the main points, what rhythm and rime mean, and how to pick out the figures of speech. I have learned to read poems better and to look for good words and phrases. I have learned to read the biography and history to find out why a poem was written.

In reproducing these papers several mechanical errors have been corrected but care was taken not to alter the meaning of any statement made by the pupil.

Observations and conclusions. The section may be briefly summarized as follows:

1. The supervised-study group gained approximately five times as much as the control group. (See Table XLVII.)
2. The supervised-study group gained as much in ten weeks as a grade ordinarily gains in one school year, while the control group gained only two tenths as much.
3. We cannot be sure, however, that the greater gain of the supervised-study group was due wholly to the supervised-study plan of directing the work. There may have been some difference in teaching ability in favor of the teachers directing the supervised-study group.
4. The criticism may be urged that the supervised-

study group was favored by the character of the test employed to measure the progress of the groups. On the other hand it should be observed that the test emphasizes only the fundamental elements of poetry which all teachers should stress in their teaching. To fail to stress these factors is to do an inferior grade of work.

5. The marked superiority of the supervised-study group, apparently, should be attributed largely to the following factors:

1) A better diagnosis of the needs of the class and the application of more effective measures.
2) More definite assignments, emphasizing the essential features of the study of poetry.
3) Specific instruction in the proper methods of studying poetry. The pupils were carefully instructed in the methods of study as they apply to study for appreciation.
4) The discussion of large and fruitful topics. The discussions were all based upon fundamental topics or questions, such as the aim, or intrinsic function, of the poem, the central theme, the emotions aroused, and the elements of technique employed. The teacher of the control group—as teachers usually do—spent much of the time discussing comparatively trivial topics.

6. In general, the results of this experiment indicate that supervised study is markedly superior to the usual methods of instruction.

General Observations and Conclusions

In the foregoing experiments there are several variable factors that could not be controlled rigidly under ordinary school conditions.

1. The teacher. In all the preceding experiments the teacher is a variable factor. It is highly improbable that any pair of coöperating teachers in any one experiment would be exactly equal in teaching ability or that the pair would teach with an equal degree of interest and enthusiasm throughout the experiment. Furthermore, it seems about equally improbable that any teacher would teach two sections or classes with an equal degree of efficiency and at the same time follow an essentially different method with each section. In fact, the teachers having two sections—the supervised and the unsupervised—confessed their inability to keep the two methods of procedure distinct, although they made an effort to follow instructions implicitly.

In selecting teachers to coöperate in the experiments, however, care was taken to avoid favoring constantly either the supervised or unsupervised groups. Teachers had to be selected, in part, on the basis of their willingness to coöperate but, as far as possible, teachers holding similar positions in the same school system were paired one against the other. This arrangement provided for approxi-

mately equal help from the regular supervisory force. It was found to be impractical, under school conditions, to equalize the factors of education and experience for the reason that teachers holding similar positions in the same school system differ widely in preparation and experience in teaching. These factors should be considered, however, in estimating the comparative efficiency of teachers.

The reliability of education and experience as measures of teaching efficiency remains an open question. After studying 504 cases, Meriam came to this conclusion: "After the first year the amount of experience is not an important criterion for efficient teaching in the elementary schools." In this study the teachers were given an efficiency rating by their principals, which was based largely upon subjective factors. On the basis of an extended study of the relation of length of service to efficiency in teaching, Coffman came to a similar conclusion: "These tables and graphs accompanying them certainly justify the conclusion that experience does not contribute much to the efficiency of the public school teacher." Coffman likewise found no uniform relation existing between the amount of salary received and education beyond the elementary school. His essential conclusions on this point were: "(1) The first four years of training beyond the elementary schools have little

or no effect on salary; (2) correlation between salary and education becomes increasingly marked with each succeeding year after the fourth year." Using the salaries received by men in the private secondary schools of five cities as a measure of efficiency in teaching, Thorndike found that the full effect of experience in teaching in private secondary schools is reached in three years. For full text of these investigations, see:

J. L. Meriam. *Normal School Education and Efficiency in Teaching.*

L. D. Coffman. *The Social Composition of the Teaching Population.*

E. L. Thorndike. *The Teaching Staff of Secondary Schools in the United States.* Bureau of Education Bulletin No. 4. 1909.

These studies indicate that experience after the first three years does not contribute much to efficiency in teaching. They also suggest that education, particularly beyond the elementary school, is a more reliable measure of teaching efficiency than are years of experience. These facts should be given due weight in considering the comparative efficiency of the various pairs of teachers coöperating in the experiments.

2. The pupils. The pupils participating in these experiments constitute another variable factor. An effort was made to select groups of pupils that would be comparable in size, in mental ability, and

in initial achievement; but it was not possible, under the limitations imposed by school conditions, to arrange strictly comparable groups. An attempt was made however to determine the native ability and initial achievement of each group by employing the devices described in the following paragraphs.

1. Native ability. In most cases a group intelligence test was used to determine the native ability of the pupils. These tests were administered to all the groups studying subjects that have been found to have a marked correlation with general intelligence. In subjects like handwriting, having little or no correlation with intelligence, two secondary measures were employed: the average age and social status of the pupils.

2. Initial achievement. Initial achievement in the various subjects was measured by preliminary tests which were the same in each case for comparable groups. The standard tests were used in all cases, if these tests were available. Both the initial and final tests were administered by the writer or the principal of the school.

Conclusions. Since there were so many factors that could not be rigidly controlled the significance of the results obtained remains more or less in doubt. For educational practice, however, the outstanding fact is that the supervised-study groups made more gain than the unsupervised with one exception; namely, in the rate of reading.

1. In five of the six experiments there is a significant difference in favor of the supervised-study groups, the

difference in the medians being from four to ten times the probable error of the difference.

2. In experiment 5, Problem Solving in Arithmetic, the difference is small but in favor of the supervised-study group.

3. In terms of school years there is a decided difference in favor of the supervised groups, except in the rate of reading.

4. On the basis of the percentage of the supervised-study groups equaling or exceeding the median of the unsupervised, there is a significant gain in seven out of ten comparisons. In one instance the gain is small and in another there is a difference in favor of the unsupervised group.

5. In most cases, the pupils of the lower quartiles make more gross gain than those in the upper quartiles when working under a supervised-study plan, but the differences are small.

REFERENCE FOR CLASS USE

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